JAN 1926

PUBLIC WORKS

CITY COUNTY STATE

Nationally laid

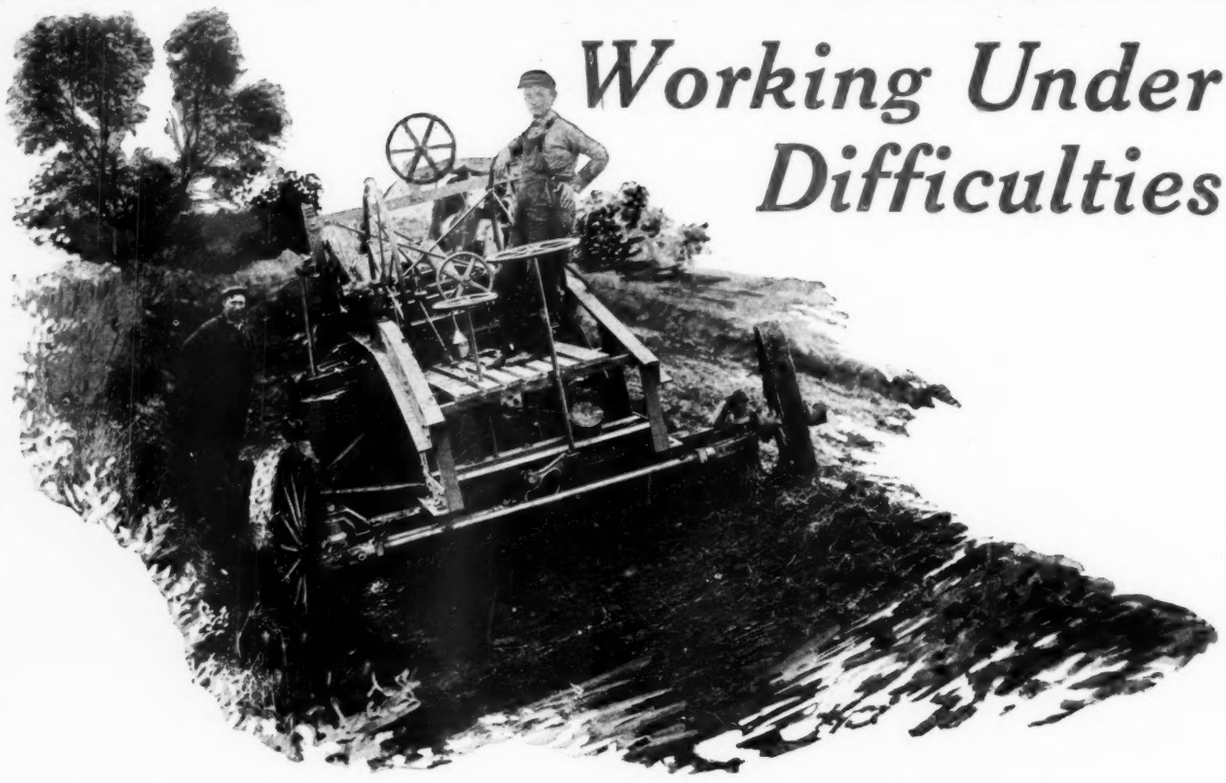
Nationally approved

TEXACO

THE ASPHALT PAVEMENT OF 1175 U. S. CITIES

The Texas Co., U. S. A. Asphalt Sales Department

DECEMBER, 1925



Working Under Difficulties

THE AUSTIN-WESTERN LINE · IT SERVES YOU RIGHT ·

No Handicap to

AUSTIN-WESTERN GRADERS

For over 40 years AUSTIN-WESTERN Graders have met and defeated all obstacles and problems in highway construction. With thousands of these machines demonstrating their supremacy, sales are increasing yearly.

Catalogs of Rollers, Crushers, Sweepers, Sprinklers, Road Oilers, Dump Wagons sent on request.

Send for our big grader catalog

The Austin-Western Road Machinery Company

400 N. MICHIGAN AVENUE **CHICAGO, ILLINOIS**

VOL. 56 NO. 12

Entered as second-class matter at the Post Office, at New York, N. Y., Sept. 1, 1922, under the Act of March 3, 1879.
Published monthly by PUBLIC WORKS JOURNAL CORPORATION, 243 West 39th Street, New York, N. Y.
Subscription price $3.00 a year, single copies 35 cents.

PUBLIC WORKS
CITY COUNTY STATE
A Combination of "MUNICIPAL JOURNAL" and "CONTRACTING"

Vol 56 December, 1925 No. 12

Effect of Pleasure Traffic on Bronx Park Roads

Effect of an intense traffic of pleasure vehicles, using pneumatic and balloon tires, on asphalt block and bituminous concrete road surfaces. A seal coat protects from appreciable wear.

By L. G. Holleran*

The Bronx River Parkway Reservation extends for a distance of over 15 miles from the Botanical Gardens of Bronx Park, in New York City, to the Kensico Dam, 4 miles north of White Plains.

The reservation consists of a strip of land from 200 to 1,200 ft. in width, through which the Bronx river winds and turns on its way from the Westchester hills. The reservation extends through a thickly settled region for about two-thirds of its length, including within its boundaries portions of the northerly part of Bronx Borough, city of Mount Vernon, city of Yonkers, villages of Bronxville, Tuckahoe and Scarsdale, and city of White Plains.

The inception of the project of the Bronx River Parkway grew out of the drainage problems presented by the Bronx river as the growth of population with resulting increase of sewage and other pollution developed unsanitary and obnoxious conditions along the river valley. Building development brought about the conditions which usually prevail along unprotected and neglected water courses. The originally beautiful marginal lands of the river were used as promiscuous dumping grounds for refuse. Swampy pools were frequently flooded and the receding waters left foul deposits and mosquito breeding pools that were a menace to public health.

After the land had been acquired, the plans for the parkway drive were developed and now have been consummated in the parked driveway providing an outlet from the City of New York to the magnificent state highway system diverging from the Kensico dam and reservoir, extending throughout Westchester and Putnam counties, where New York City owns over thirty thousand acres of beautiful water-shed lands and lakes. The driveway also connects with the Westchester County Park System at various points.

DESCRIPTION OF PAVEMENT.

This Commission has constructed approximately twenty miles of driveway 40 feet in width for the most part, but separated into two 20-foot drives

*Deputy chief engineer, Bronx Parkway Commission.

TRAFFIC ON BRONX PARK DRIVEWAY.

where topographical conditions require it. The pavement consists of a concrete foundation surfaced in some stretches with asphalt block, in others with bituminous concrete, both with fine graded aggregate known as the Topeka type and also with coarse graded aggregate. The yardage of the various types of pavement is approximately as follows:

Asphalt block	163,100 sq. yds.
Bituminous concrete, Topeka	70,200 sq. yds.
Bituminous concrete, coarse graded aggregate	135,500 sq. yds.
	368,800 sq. yds.

The mixture used in the concrete foundation consisted of one part of cement, 3 parts of sand, 6 parts of crushed stone or gravel. The concrete foundation is 5-in. and 6½-in. thick at the sides and 7-in. at the center, with curbs flush with the surface pavement on embankments and curbs laid integral with the foundation and extending 3 inches above the surface pavement through cut sections. The finished pavement, which follows a parabolic curve in transverse section, has a crown of 5 inches in the width of 40 feet. This crown provides satisfactory lateral drainage, even on flat grades. The bottom of the concrete base is formed by two straight lines from each side to the center of the roadway, which deviates from the horizontal by only 3 inches at the center. All types of bituminuous wearing surface are 2½ inches thick after completion and the asphalt block pavement consists of 2-inch asphalt blocks laid on a one-half-inch to three-fourth-inch bed with sanded joints.

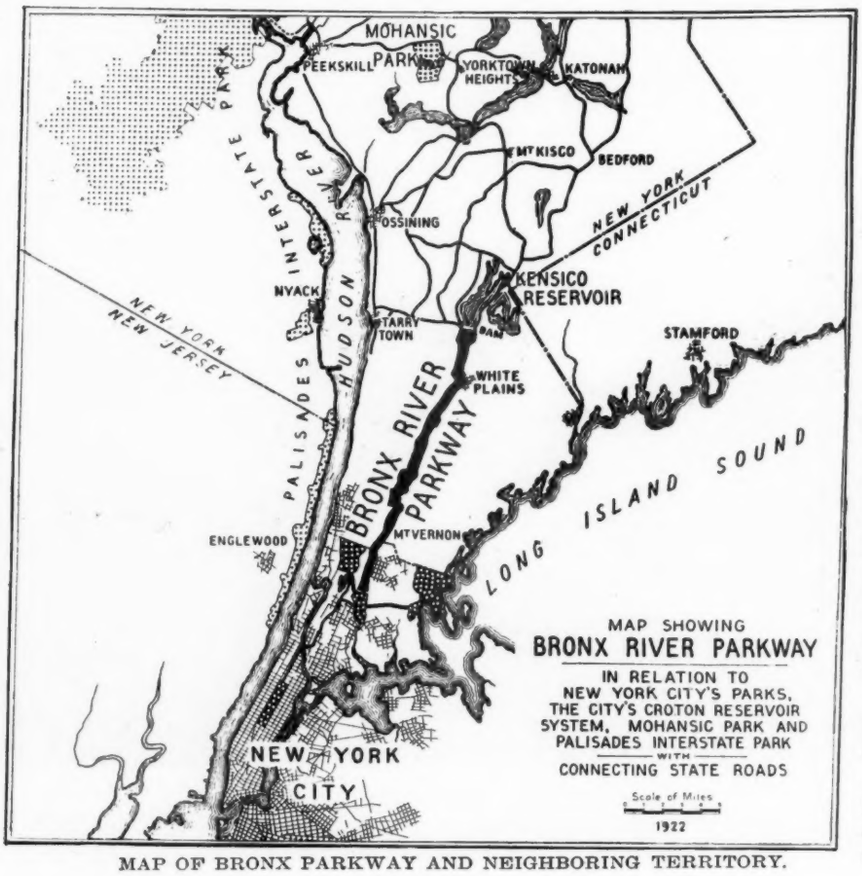
The two types of bituminous concrete were manufactured at stationary asphalt plants where the distance to the driveway was within economic hauling distance, and in other cases at portable asphalt plants nearer the site of the work. At the asphalt plants the various ingredients were carefully weighed. Asphalt cement having a penetration of from 50 to 60 Dow method at 77 degrees F. was mixed with trap rock screenings, sand and dust. A careful check of the bituminous concrete delivered and laid was made at intervals during the day and at the end of each day's run, to compare the actual yardage laid with the theoretical equivalent as determined by test in accordance with the number of batches delivered. Methods of scientific control were adopted for all of this work, which requires very careful supervision both in manufacture and in placing material on the concrete foundation. Immediately after the pavement had been laid on the street and thoroughly rolled to a smooth riding surface, the surface was covered with a seal coat of bituminous material at a rate of approximately two-tenths of a gallon per square yard and crushed stone screenings, grits or coarse sand applied to serve as a blotter.

The asphalt blocks 5x12x2 inches were laid on ½ to ¾ inch of mortar mixed one part of cement to 4 parts of sand, and after the blocks had been laid the joints were filled with sand and the surface thoroughly broomed.

TRAFFIC CARRIED.

On May 24, 1924, a traffic census of motor vehicle traffic was taken by the engineers of this commission in the vicinity of 233d street, Bronx, New York City, and the total number of motor vehicles passing was 17,700 in 13 hours. In this connection it is rather interesting to refer to the chart illustration showing the results of the traffic census at that time. The first traffic peak was reached between the hours of 11 to 12 A. M. for northbound traffic, when the cars were traveling at the rate of 845 cars per hour. The second traffic peak for northbound traffic was reached between the hours of 3 and 4 P. M., when the cars were traveling at the rate of 1,240 cars per hour. For southbound traffic the maximum traffic peak was reached between the hours of 6 and 7 P. M., when cars were traveling at the rate of 1,610 cars per hour. It is estimated that traffic has increased over 30 per cent since this census was taken.

The driveway is used exclusively by pleasure vehicles, and a Bronx River Parkway ordinance stipulates that no person shall drive a vehicle at a rate of speed exceeding 25 miles per hour on that part of



MAP OF BRONX PARKWAY AND NEIGHBORING TERRITORY.

the parkway lying in Bronx County, or 30 miles per hour on that part of the parkway lying in Westchester County.

EFFECT OF TRAFFIC ON PAVEMENT.

Several years observation of the effect of the intensive motor vehicle traffic over the various types of pavement, leads to the conclusion that the effect of pneumatic and balloon tires on the bituminous concrete surface does not cause ravelling or appreciable wearing of the surface if the seal coating is properly applied in the first instance. If the seal coating wears away, exposing the crushed stone aggregate, there is a decided tendency for the surfacing to disintegrate due to the suction caused by the movement of the tires over the surface. The remedy for this tendency is to so maintain the pavement that its surface always has an adequate seal coat.

In the case of asphalt blocks, the pneumatic and balloon tires cause a vacuum which tends to remove the sand from between the blocks and allow water to penetrate into the mortar base, which will cause the blocks to loosen and jump out of place. The remedy here is practically the same as for bituminous pavement, that is, proper seal coating. It is our opinion that in the construction of asphalt block pavement it is very desirable that a seal coating consisting of asphaltic oil and limestone screenings be specified as part of the original construction.

There is a tendency during the winter months, if the snow is not removed from the entire surface of the roadway, for the traffic to follow the ruts, and when skid chains are used they have a tendency to cut the into the surface of all types of asphaltic pavement. The remedy for this trouble is to clear away the snow as quickly as possible and thus distribute traffic over the whole pavement.

Where the grades were over 6 per cent, the seal coat was omitted from the bituminous concrete pavements in order to provide for the non-skid surface, but experience has shown that asphalt blocks laid in hillside construction are the best insurance against skidding on curves and grades.

The development of the Bronx River Parkway Reservation is under the jurisdiction of the Bronx Parkway Commission, consisting of Madison Grant, president, William W. Niles, vice-president, and Frank H. Bethell, treasurer. Engineering and construction work is under the supervision of Jay Downer, engineer and secretary; L. G. Holleran, deputy chief engineer, and W. F. Welsch, division engineer.

To Test Thin Paving Brick

The U. S. Bureau of Public Roads is about to conduct a series of tests for the purpose of establishing, if possible, a measure of the comparative value of vitrified paving brick of various depths, particularly those less than 3 inches thick. For this purpose the Bureau utilized the concrete base of the circular track at the Arlington Farm, Arlington, Virginia, from which the sheet asphalt sections composing the second series of stability tests have been removed, as the base for a series of vitrified paving brick wearing courses of the following depths: 2, 2½, 3, 3½ and 4 inches. The brick have been donated by the manufacturers through the co-operation of the National Paving Brick Manufacturers' Association and the various sections were constructed by expert pavers employed by the association.

It is proposed to test the experimental pavement by means of a motor truck equipped with solid-rubber tires, which will be driven around the circle at a given speed and under various increments of loading. This will be followed by a second series of tests, using the same truck and loads, but with the wheels equipped with non-skid chains.

To eliminate as far as possible all variables except depth, all brick were obtained from one manufacturer. Half the pavement was built with a plain sand bed and half with a cement-sand bed mixed 1:4. A section of each depth of brick was laid on each kind of bed, giving ten sections each about 53 feet long. Change from one depth of brick to another was made by varying the depth of bed in a length of two or three feet. In this length and in the center of each section was built a "dutchman" to allow for the curvature of the track.

It is planned to test this pavement with truck loads, increasing from 3 tons to 7½ tons, making ten thousand trips with each size of load. This will be followed by use of chains on the wheels; and this, if necessary, by even greater impact produced in some way. The tests have been begun and will continue for several months.

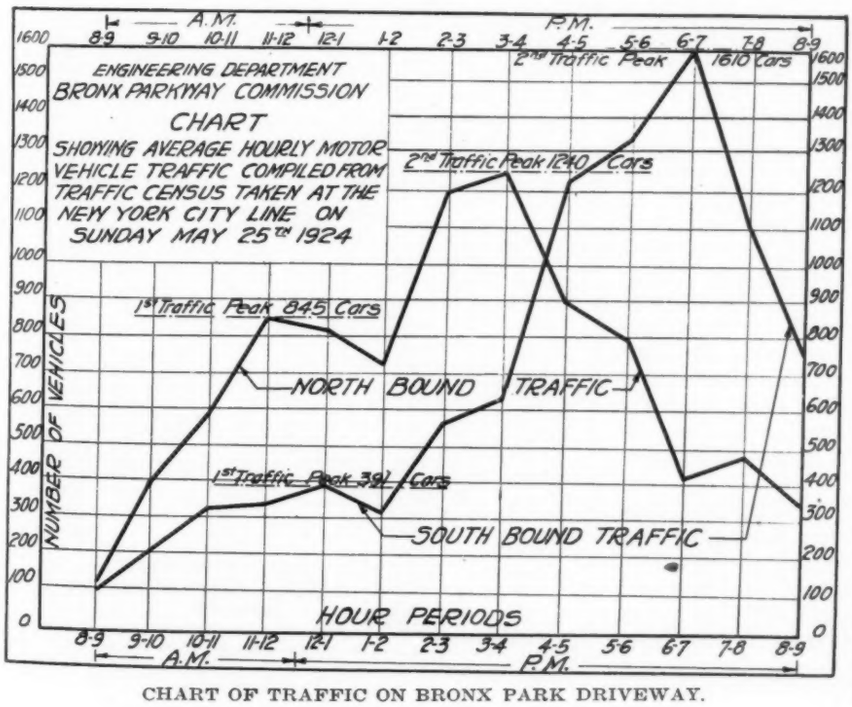

A.M.
P.M.
8-9 9-10 10-11 11-12 12-1 1-2 2-3 3-4 4-5 5-6 6-7 7-8 8-9
ENGINEERING DEPARTMENT
BRONX PARKWAY COMMISSION
CHART
SHOWING AVERAGE HOURLY MOTOR VEHICLE TRAFFIC COMPILED FROM TRAFFIC CENSUS TAKEN AT THE NEW YORK CITY LINE ON SUNDAY MAY 25TH 1924
2nd Traffic Peak 1610 Cars
2nd Traffic Peak 1240 Cars
1st Traffic Peak 845 Cars
NORTH BOUND TRAFFIC
1st Traffic Peak 391 Cars
SOUTH BOUND TRAFFIC
NUMBER OF VEHICLES
HOUR PERIODS
0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300 1400 1500 1600

CHART OF TRAFFIC ON BRONX PARK DRIVEWAY.

Administration and Location of State Highways

Organization of State Highway Departments. Maintenance most important function from administrative point of view. Field procedure of making location. Qualifications of a locating engineer.

By Geo. F. Syme*

At the present time, while so many of our States are actively engaged with programmes involving the expenditure of money by the millions, and while other states are realizing that they too will soon be compelled to join this movement which is surely and swiftly enlisting every state in the Union and reaching out into the neighboring countries to the North and South of us, it is well for the engineering profession and the technical colleges to take stock of their assets in trained personnel on whom will devolve the future responsibility for the raising and wise expenditure of billions of dollars; and it is well, too, for them to realize, now, that the demand for competent highway engineers has already exceeded the supply.

Many states may soon find themselves in possession of say from twenty-five to one hundred million dollars or more, together with a sudden and impatient public demand for a complete and modern State highway system, with the usual supply of critical and avaricious politicians and office seekers in its wake. Their small highway departments will be called upon to suddenly expand and numbers of able engineers must be employed. If they cannot be found, inexperienced and incompetent men must be substituted with resultant heavy losses to the states.

It is the hope of the writer that small departments in other states may find in this article a few worth-while hints which might aid them in the successful administration of their highway programmes, at least to the extent of enabling them to anticipate and avoid some costly experiments and difficulties which they might otherwise encounter.

To get satisfactory results, the work must be thoroughly and speedily systematized, and an efficient, simple, and smoothly functioning overhead central organization must spring into being, over night as it were.

The greatest desiderata for such an organization are strict administrative honesty, absolute freedom from politics, the complete elimination of county participation in state work, and assurance of continued employment, so far as possible, of employees who have proven their competence.

In the spring of 1921, the North Carolina State Highway Commission, then a small organization struggling in the throes of county domination, was directed by the legislature to construct and maintain a state system of some 6,000 miles of hard-surfaced and other dependable roads, connecting by the most practicable route the various county seats and other principal towns in each of the one hundred counties. With this order, fifty million dollars became available as a starter. This has been followed by substantial appropriations from each legislature since, and there is a likelihood of more to follow.

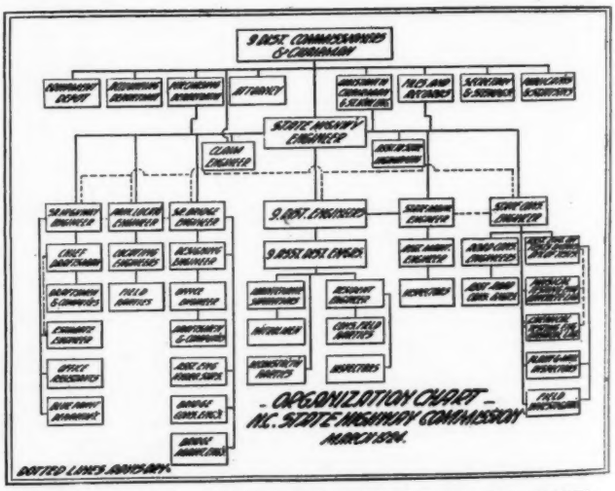
The accompanying chart shows the entire North Carolina highway organization as it is functioning today.

The North Carolina State Road Law of 1921, as amended in 1923 and thereafter, is thought by many to be one of the best and most practical pieces of legislation of its kind ever enacted. A great part of the success attained by the North Carolina Highway Commission is due in a large measure to this workable legislation, and state highway officials, engineers and others interested in securing highway legislation for their states will do well to study the North Carolina law.

MAINTENANCE

The writer believes that from an administrative view point, the matter of maintenance transcends in importance any other phase of the work of a highway organization, for when roads are well maintained and plainly marked the public is pleased, and this means legislative approval and a continuation of the state highway programme relatively free from political interference.

One of the first and most serviceable accomplishments of the North Carolina Commission following the Act of 1921, was to immediately take over, map, repair, mark, and maintain those existing roads which were to form the System



ORGANIZATION, NORTH CAROLINA STATE HIGHWAY DEPARTMENT.

*Sr. Highway Engineer, N. C. State Highway Commission, Raleigh, N. C.

prescribed in the Act. These were to be relocated and permanently rebuilt at a later date, but the immediate task in hand was to provide the public with serviceable roads as quickly as possible.

There were about 6,000 miles of these roads. They were for the most part in deplorable condition, some of them were at times impassable and many bridges built years before for horse traffic were dilapidated and unsafe.

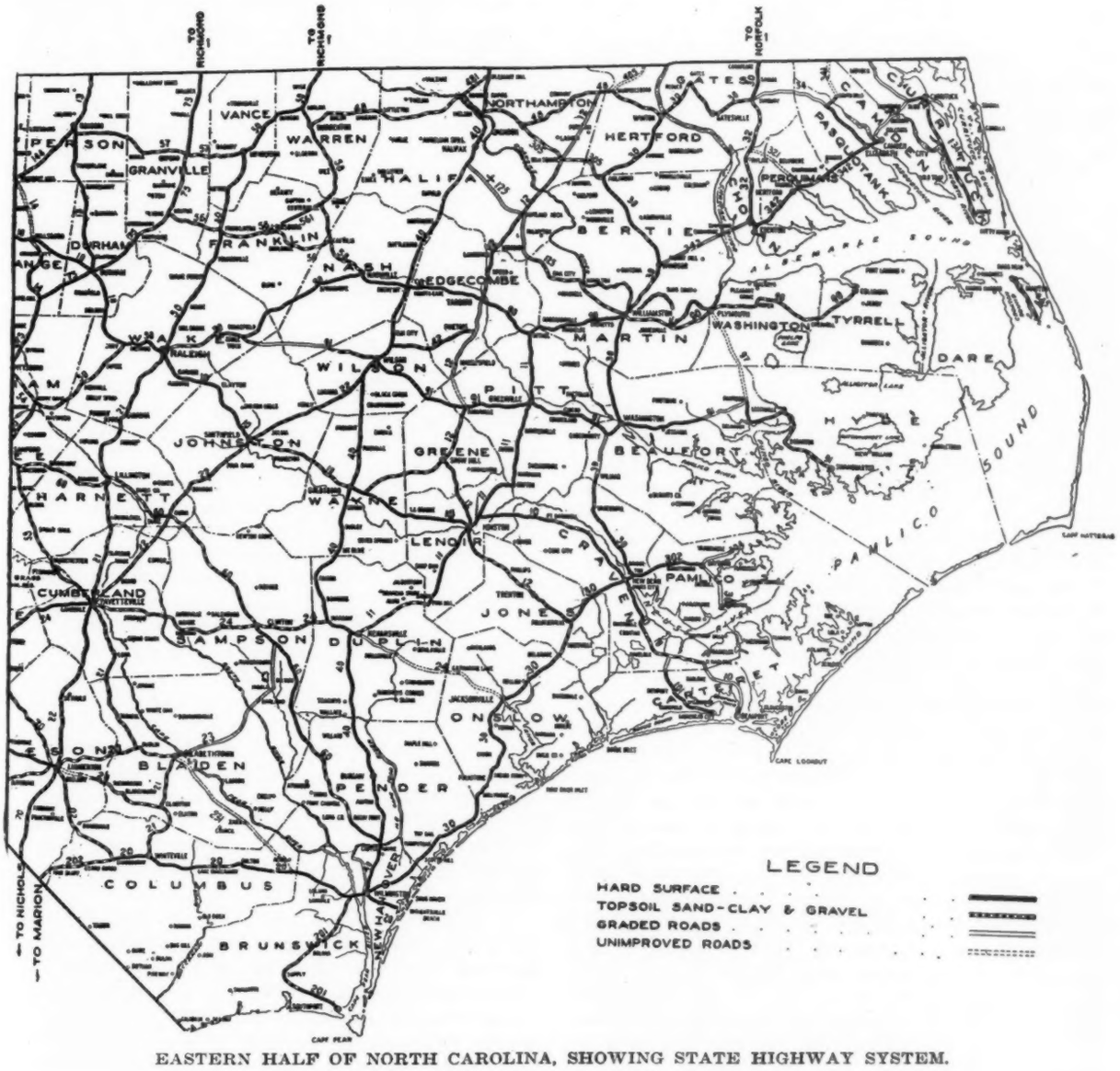
The entire thought and energy of the Commission was for awhile concentrated on this undertaking. Organizations, equipment, labor and materials were rushed to every part of the state and in a surprisingly short while all roads were made safe and open for comfortable travel. The patrol system of maintenance was then established and the roads were kept in good condition until replaced by the new construction.

A map of the State System was prepared for public distribution. It is revised every year and shows the route numbers by which all roads are marked, the types of pavements, and other pertinent information. On the reverse side of the map is shown a flexible table of distances from any county seat to any other county seat in the state.

With all roads clearly marked and kept in good condition, the motorist, aided by his map, can travel with ease and comfort anywhere in the state. The result of this is a satisfied public, which demands the continuation of highway expansion.

LOCATION

The writer believes, after years of study and observation, that the subject of highway location should rank second in importance only to that of maintenance. He also believes that more money is wasted on account of poor location than from all other sources of engineering error in highway work combined, and the worst feature of it is that the greater part of this wastage is not visible to the eye of the layman.



EASTERN HALF OF NORTH CAROLINA, SHOWING STATE HIGHWAY SYSTEM.

In some states the location of a road, established in the early days, is fixed and the engineer is limited in his efforts to improve line and grade. Not so in North Carolina to any very great extent. Here the problem is to find that location which will serve the most people and at the same time, within proper limitations, be the most direct route between centers of population. Involved in this are such difficult objectives as low cost of construction, economic grades and curvature, ease and safety in operation, elimination of grade crossings, estimates of future traffic expansion, and susceptibility to future improvement when traffic conditions make it necessary.

Motor traffic is increasing everywhere with such amazing rapidity that it is impossible to supply the demand for suitable roads. This traffic consists principally of three classes, automobile, bus line, and freight truck. Many carelessly located roads, built a few years ago to suit the then existing traffic are already obsolete, and some roads now under construction may become so almost before they can be completed.

Expanding traffic calls for more, larger and heavier vehicles, and these in turn demand wider pavements, easier curves and grades, elimination of grade crossings and other hazards to life and property, and the expenditure of larger sums of money.

The locating engineer therefore has three major problems to consider: (1) his alignment must fit the ground properly so as to secure a minimum cost of construction. (2) It should be so laid with reference to grades, curves, rise and fall, distance, and safety as to give a minimum operating and maintenance expense for the immediate traffic in sight, and (3) it should be so located as to permit future improvements in width, curves, and grade when increased traffic makes this necessary.

Too often in heavy rolling or mountainous country, the available funds are very limited, necessitating the construction of a narrow and cheap road with a view to improving it later, and here the problem calls for the best skill the profession has to offer.

Frequently such a line may be run on what is to be the future maximum grade, but constructed on temporary broken grades so laid that they may be later cut down to the permanent maximum. In coming down a mountain, very sharp curves through considerable angle may have to be introduced in turning a point or a ravine. The grades on such curves should be heavily compensated, not only for the sake of safety in operation, but with an eye to future betterment in bringing the road to its permanent alignment, for when these curves are eliminated, or replaced by curves of longer and safer radii, there will be a shortening of distance and the elevation saved by liberally compensating the grades on the original curves, and their approaches if necessary, will be needed to overcome the grade elevation lost by the shortened distance. From a study of his paper location, the engineer can determine the amount of compensation needed to meet this future requirement, and whether or not it should be extended over the approaches of a given curve.

A costly temporary mountain road would hardly be constructed unless there were considerable traffic to use it. Imagine such a road where solid rock predominates, narrow, carelessly located, containing many very sharp loops and curves of say 50 feet radii or less, and all on a continuous 7% grade without any compensation. In a few years the traffic will increase, large passenger busses with excessive wheel bases will be put on, which can only negotiate such curves at great risk, or not at all. It will then be necessary to build a road that can be safely operated under a heavy traffic. In such a case the probability is that this road could not be rebuilt, and its original cost would represent a total loss. A new road, supported on the same 7% grade would have to be constructed on an entirely new location, whereas if the original road had been carefully located with provisions made for future betterment, much of the heavy grading might have been utilized during the reconstruction.

In flat level country, as the coastal plains, or prairies, location is very much simplified. Here the chief difficulties are drainage, the crossing of swamps and large streams, and the dodging of railroad crossings.

To the writer, it seems that our profession, our technical colleges, highway organizations and text books do not give sufficient attention to location. In our mad haste to spend public funds it looks as if small thought is given to this one, and only permanent feature of our highways, their location.

It has been said that location is an art, and that locating engineers, like poets, have to be born and not made. This is only partly true. Location is both an art and a science, and is rapidly becoming more of the latter and less of the former.

The writer thinks that the qualifications for the ideal locator should be as follows: he should be a man of irreproachable character, well educated, of pleasing personality, unafraid of criticism, possessed of a complete and applicable knowledge of mathematics, mechanics and geology, of long and high classed experience in both location and construction, possessed of a keen knowledge of the use of contours and other topography, thoroughly recognizant of the fact that grades, rise and fall, curvature and distance, have negative values; and he should have a real knowledge of the value of men and money, indefatigable energy and determination, ability for organization, and an "eye for country." Such a man must indeed be not only to the manner born, but he must also be "made" both in the college and in the field.

A few suggestions on field practice might not be amiss in concluding these comments. Let us assume that a road is to be built connecting a valley town with a point at the summit of a mountain pass, that the reconnoissance has been made, and that the general route, the maximum grade and minimum curve have been determined.

The preliminary survey and final location remain to be made.

The preliminary or traverse line should be run *down* from the summit on the maximum grade, allowing compensation for the sharper curves. This line should be run with great care and precision as to instrument work and chaining. Each night the traverse should be accurately platted to a scale of 100 feet to the inch and inked in red.

In running the line, the engineer should try, of course, to place it as close as possible to where the final location will be, but he should not waste his time on unnecessary refinement. However, he should endeavor to keep it approximately of equal length with the location, for there is a tendency for the location line to "gain or lose distance" on the preliminary, and this might be serious on a steep, supported grade line. Each night he should check up on the grade compensation and on the relative lengths of the preliminary and the future location by making a rough projection of the location on the traverse map in pencil and scaling its length. If he finds any material difference in grade elevation due to compensation or to difference in length between the two lines, he should change his grade elevation at the last station of the day's traverse to conform with the projected requirement, and continue his survey next day starting with the corrected elevation. The pencil projection should be erased as soon as the grade adjustment has been determined.

While the preliminary line is being run, a topography party should be taking contours and other topography. These should be taken with great care, using a hand level, tape and rod. Stadia topography is hardly accurate enough to project location from. The contours should then be accurately platted on the traverse map in orange or sienna, and the other topography in suitable colors.

The next step is to draw a short stretch of grade contour on the map, allowing for the compensation of sharp curves. This piece of grade contour should probably not exceed 2,000 feet in length because of the necessity for accurate allowance for compensation, and because of the possible differences in lengths of the two lines, thus throwing the grade contour in error. It should be inked in blue or light green.

The engineer should then carefully project his location to fit this grade contour as closely as possible, take off his profile from the contours, and establish thereon his correct compensated grade line. Then with the correct grade elevation at the end of this short projection he should start a new grade contour for another short stretch and project location and profile as before, and so on to the end of the project.

He should then estimate the quantities from the projected profile, making such vertical adjustments of the grade line as will balance the quantities to the best advantage.

With an accurate contour map, the engineer can study all the details of his location and make as many changes or adjustments in the alignment in his office as may be necessary to secure the best results, and at a great saving in time and expense over the cut and try, hit or miss, field location method so often used in highway work; moreover, when his work is done he *knows* that his location fits the ground to the best possible advantage.

After the projection is completed, it should be inked in black, the intersection angles carefully scaled off, tangent distances and lengths of curves computed, P.C's and P.T's spotted, radii drawn to intersection, and central angles scaled to check the intersection angles of the tangents; and finally the stations, including those of P.C's and P.T's scaled off and marked on the map, the scaling around each curve being corrected by the computed curve length if necessary.

All that remains to be done now is to reproduce the location on the ground. Each night the engineer should make a pencil tracing of as much of the projected alignment as he can run in during the day following. He should also trace the corresponding portion of the preliminary line and at frequent intervals show the scaled lengths of offsets from convenient stations on the preliminary, to the location; and of course he should show all of the scaled central angles.

In the field, by means of these offsets, he establishes two transit points from which to start the location, being sure to see to it that station zero has the same relation on the ground to the preliminary line and to the projected line that it has on the map. He then simply runs in the alignment as projected and when the station number of a P.C. shown on the map is reached on the ground, he puts in a transit point and without stopping to run the tangents to intersection, simply runs in the curve from this P.C. through the scaled angle shown on the map. At the P.T. station he turns tangent and runs on to the next P.C., and so on. He should, however, frequently measure offsets from the preliminary to the location to be sure that the relation of the two lines on ground and on paper are the same. If all work is carefully done, he should be able to run on in this manner for a considerable distance before the relation of the two lines begins to vary to any appreciable degree. When he notes a tendency toward such variation he selects from his map a nearby curve ahead which can be easily and quickly run to intersection. When he reaches the P.C. of this curve, he lays the forward tangent by the scaled offsets from the preliminary, runs out the intersection and is "on his projection" again.

Should the chaining begin to vary from the stations scaled on his tracing, he corrects the latter by means of an equation at some convenient point, and proceeds as above.

The foregoing process is, in the writer's opinion, representative of the proper method for making a highway location in heavy, difficult country.

All-Western Road Show

Held in San Francisco November 9th to 14th. Every phase of highway building and maintenance represented in 200 displays housed in five large tents. A ten acre demonstration field provided for actual operation of shovels, tractors, graders, scrapers, and other types of road building machinery. United States Government had comprehensive display of Federal aid activities. Many conventions held in connection with the show.

By Charles W. Geiger

America's first All-Western Road Show was held in San Francisco November 9 to the 14th, occupying 25 acres on the Marina, the historic location of the Panama-Pacific International Exposition. Every phase of highway building and maintenance was represented in the 200 displays which occupied five large tents. A space of ten acres was provided in front of the exhibition tents where shovels, tractors, graders, loaders, drag-lines, and many other types of road building equipment were actually in operation. Many of the machines on display in the tents were also in operation, this being made possible by connecting the exhaust with pipes passing under the ground and extending outside the tents. The biggest spread of canvas ever erected in the entire West was required to house the two hundred exhibits. One tent 150 x 300 feet, one 188 x 288, and three 100 x 300 comprised the exhibition group of temporary roofs.

The equipment arriving by railroad was unloaded directly from the cars at a point near the grounds, as the Belt Line railroad operated by the California Harbor Board passes the site. Special unloading platforms were built alongside the railroad tracks which greatly facilitated the unloading and loading of equipment.

The San Francisco Fire Department provided adequate protection for the show and the exhibits by having a fully equipped fire station centrally located, with a White chemical engine ready to be called into instant service.

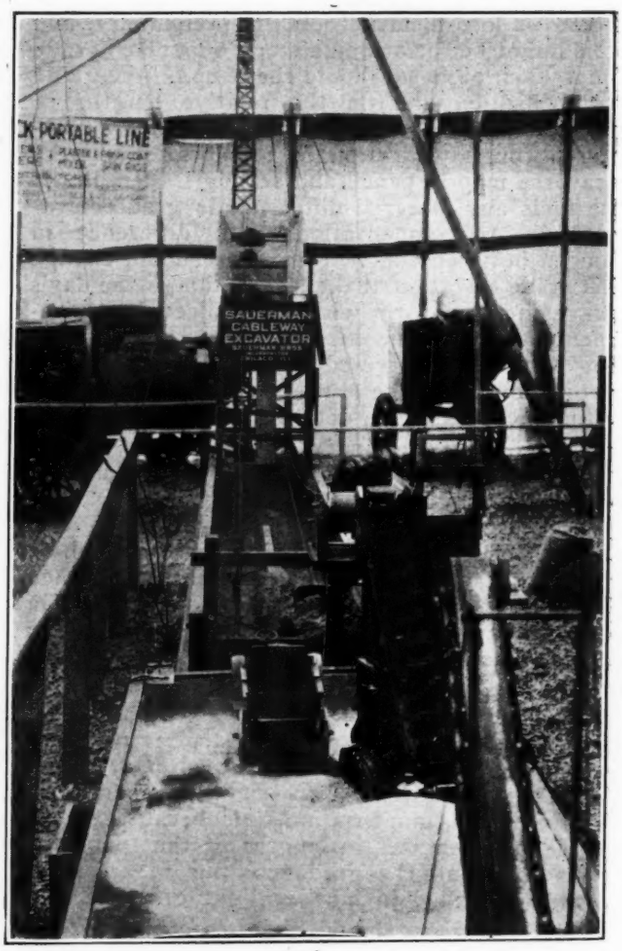
Due to the cooperation of the Automobile Clubs, all streets leading to the Marina were posted with signs and arrows and "This car direct to the Road Show" appeared on the front of the Municipal cars and the Market Street Railway cars that travel to the grounds.

Temporary telephone and telegraph service was installed on the grounds, as well as restaurant facilities, registration headquarters, information booth and all else that would promote ease and efficiency. Half a dozen conventions had their headquarters in a hall located on the Marina, where every facility was provided for their comfort and business procedure.

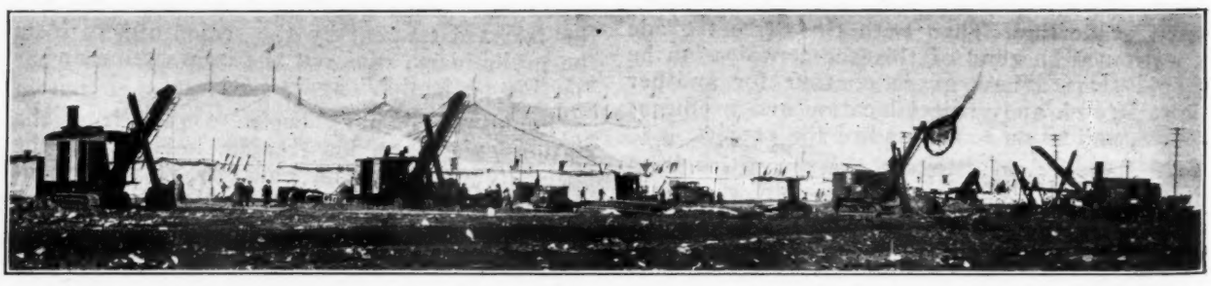
The United States Bureau of Public Roads displayed an instructive exhibit in the end of the convention hall.

The large demonstration field proved its value to both the exhibitors and the visitors, creating a vivid picture of the capacity and possibilities of the machines which inanimate stationary exhibits could only hint at.

A large number of working models, miniatures of the real thing, were found among the displays under



SOME OF THE WORKING MODELS.



SECTION OF DEMONSTRATION FIELD WITH SHOVELS IN OPERATION. EXHIBITION TENTS IN BACKGROUND

canvas. Experienced exhibitors are finding this a very satisfactory way to tell their stories without going to the expense of transporting fifteen or twenty tons of machinery to the show. And every body likes to watch a working model.

CONVENTIONS AND CONFERENCES

The week was divided into conventions as follows:

Monday, November 9.—Annual Convention of Western Association of State Highway Officials.

Tuesday, November 10.—Good Roads Day.

Wednesday, November 11.—Road Commissioners and Supervisors Day.

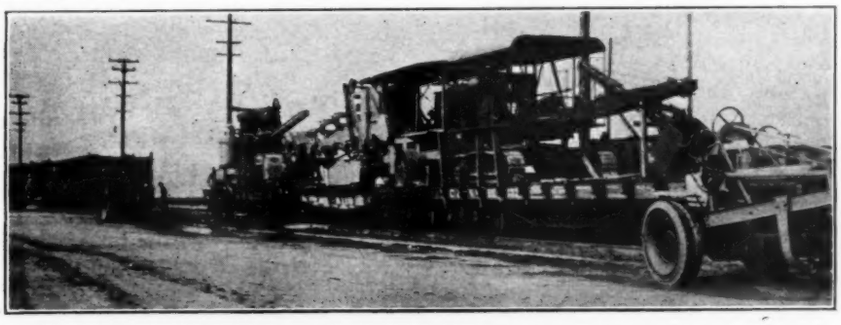
Thursday, November 12.—Contractors Day.

Friday, November 13.—Annual Convention of the Pacific Sand and Gravel Association.

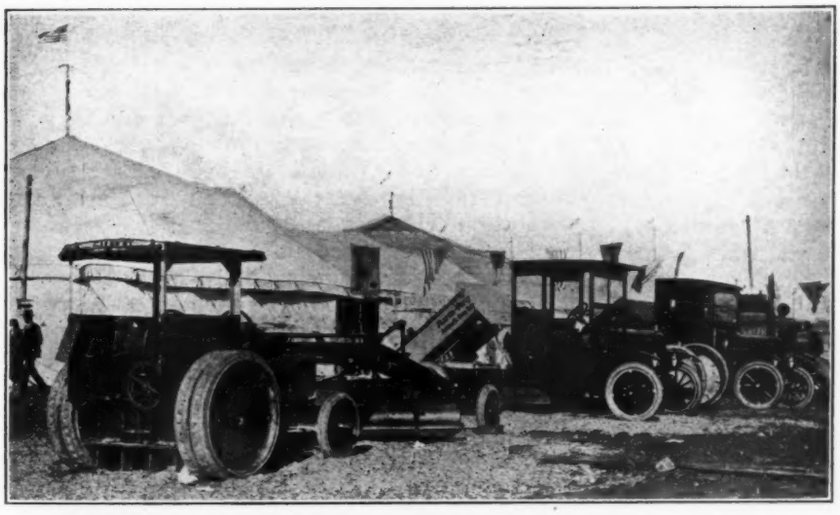
Saturday, November 14.—Annual Convention of the Western Construction Equipment Distributors.

These conventions had representatives from the Pacific Coast, Pacific Northwest and Rocky Mountain States.

Extolling the merits of Federal-State cooperation in road construction and expressing the hope that this constructive national policy will be continued, the Western Association of State Highway Officials held an informal convention in the California Highway Commission Offices on Monday, November 9.



SHOVEL (AFTERWARD PURCHASED BY BUTTE CO., CAL.) BEING DELIVERED DIRECTLY ON THE SHOW GROUNDS BY THE HARBOR BOARD'S BELT LINE RAILROAD.



PART OF THE OUTDOOR EXHIBIT.

Representatives from five States of the Western group and the Bureau of Public Roads, as well as other interested agencies, discussed the benefits that have thus far accrued from the Federal aid plan, and the hope was expressed that no steps should be overlooked to retain Federal appropriations for co-operative work because of its vital necessity to the development of the Western States, where the large percentages of public lands make it impossible to finance extensive highway construction from any other source.

Although Federal aid was the principal subject under discussion, the various phases of highway upkeep, road location and design received attention.

County road construction, finance, design and maintenance was the dominant

MACHINERY IN OPERATION IN THE DEMONSTRATION FIELD.

theme of the First Annual Convention of the Western States County Officials' Association, held on Wednesday, November 11, although the main diversified problems of county administration received serious and extensive consideration. After an interesting and instructive program of discussion resolutions were adopted demanding the continuance of Federal aid; congratulating the All-Western Road Show, and P. H. Curtis, of Western Highways Builder, on the success of the exhibition, and urging county commissioners and supervisors of each Western State to impress upon State Highway Departments the necessity of expediting the completion of interstate highway connections.

"The Aims, Objects and Purposes of the Western States County Officials Association," was the subject of the address delivered by J. K. Macomber, president of the association and supervisor of Tulare County, Calif. County Commissioner E. J. Cantonwine, chairman of the county commissioners of Walla Walla County, Washington, discussed "Day Labor," and James M. Leonard, chairman Nevada Highway Commission, gave an address on "The Continuance of Federal Aid in Highway Construction." John C. Durham, president Nevada County Commissioners Association, spoke on "County Government," and J. E. Beckley, president Colorado State County Commissioners Association, spoke on "Progress of County Government in Colorado."

THE EXHIBITS

Numerous and varied sales of almost every class and size of machinery exhibited at the Road Show was one of the outstanding features of the event. The "Sold" sign was sticking up all over the place as the end of the show drew near. Butte County, California, purchased a Speeder shovel and a county in the southern part of the State purchased a complete asphalt plant. An Austin motor pickup sweeper shown by one of the exhibitors was shipped directly from the show to San Jose, California, where it will be used in cleaning up the streets. The Nevada State Highway Commission bought two Adams road maintainers.

Many interesting remarks regarding the value of the road show were made by exhibitors. Said one: "The happiest idea of the whole show, to me, is the fact that you have a real demonstration field where every manufacturer has an equal chance to show his stuff. That is our biggest handicap in other road shows. We must either content ourselves with having the machines stationary inside the exhibit hall, or rent vacant lots—usually many miles from the show—at holdup prices, then try to induce the trade to go and stand in the cold and watch a demonstration." Expressing the same idea, another said: "You have hit on the ideal way, and the only way, to exhibit this class of equipment out in the open air. It means much more to us as manufacturers to be able to show our machines actually running than to have them just standing in a crowded hall, either motionless or running from a small electric motor. You have shown us people from Chicago territory some new tricks in our own game."

Members of the executive committee who made arrangements for the show and conventions are: Edward R. Bacon, Charles A. Spears, P. H. Curtis, Tracy W. Harron, J. T. Alm, E. G. Lloyd, L. E. Murphy, F. C. Edmonds, E. Earl Glass, J. H. Walter, J. K. Macomber, J. C. Durham, Stanley Abel, and Floyd O. Booe.

When it was first decided to hold the All-Western Road Show every one concerned agreed that it should be promoted at actual cost. None should receive a penny profit. The secretary, P. H. Curtis, gave several months of his time gratis. As a result of all this, show space was furnished at the ridiculously low price of 30 cents a square foot, with prospects of a rebate.

Whether or not a similar show will be held next year will be determined by the answers received from questionnaires which will be sent out.

Tunneling for Sewers in St. Paul*

Timbering in fine sand, water-bearing sandy clay and gravel. Cost of driving and concreting 12-foot and 8-foot tunnels.

By George M. Shepard†

The general system known as the Belt Line, Phalen and Hazel Park Sewer System, comprising approximately 14 miles of various sizes of sewer, the maximum being a 12-foot horse-shoe section, is part of a $7,000,000 program of relief and trunk sewer construction being carried out by the City of St. Paul. The district of six square miles which this system serves is of glacial drift formation without any well defined drainage courses. The succession of depressions and knolls impose a condition of sewer depths varying from slight fills to as much as 90-foot cuts. This condition is shown by Plate 2. As a result, approximately 1,000 feet of tunnel for the 12 foot section was necessary and 2,300 feet of tunnel for the 8 foot section. In addition to tunneling for the greater depths, several of the main highway thoroughfares and one set of railway tracks were tunneled so as not to interfere with traffic

The material encountered is glacial drift consisting of varied materials, the change from one material to another frequently taking place very abruptly. A fine sand was encountered, principally on the larger tunnels, and a water-bearing sandy clay with small amount of gravel; also some water-bearing fine sand in the smaller tunnels. The problems involved in timber work in this class of material are not new, such methods having been used in the mines of Northern Minnesota for a great many years. Had greater lengths of tunnel work been necessary, undoubtedly improved methods with shields and air could have been used. The work as carried on, however, is interesting to the average engineer and with this in mind the following notes have been prepared:

Plate 1 shows the general sewer and tunnel section. Plates 3, 4 and 5, show various phases

*Paper before American Society for Municipal Improvements.
†Chief Engineer, Department of Public Works, St. Paul, Minn.

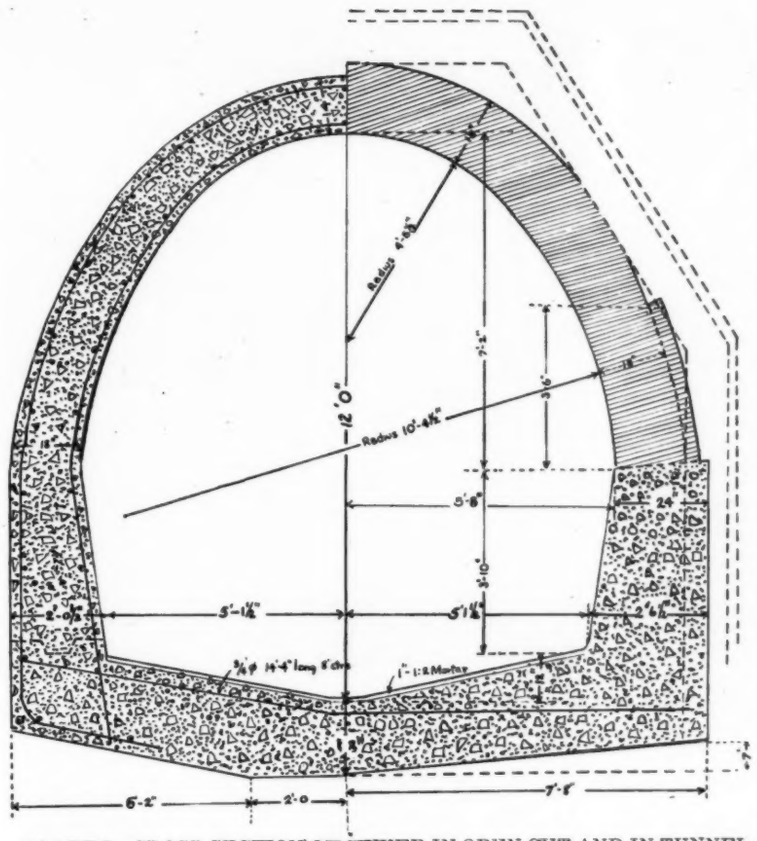


PLATE I—CROSS-SECTION OF SEWER IN OPEN CUT AND IN TUNNEL

of the timber construction previous to lining with concrete. Plate 6 shows several sections and elevations, giving the various progressive steps of the work.

The construction follows the general plan of heavy timber "sets" placed between four and five feet centers, with poling boards driven or placed in advance of the heading. Where water-bearing seams were encountered at the crown of the section or above the spring line, it was necessary to bulkhead the upper portion of the heading and in some cases to pack with hay or straw as soon as the material was removed.

Figure 1 is a longitudinal section showing the appearance of the tunnel immediately after the set "A" has been placed. The poling boards "B" are supported by the temporary cap and posts "C" and the breast boards "D" are braced back against the following set by braces "E."

Figure 2 is a cross-sectional view showing the heading under the same conditions as Figure 1. The next operation is to transfer the support of the poling boards to the new set. This is done by placing the transverse timber "F," Figure 3, directly above the cap and blocking and wedging between the boards and cap. The blocking between the timber "F" and the cap "A" is of such thickness that the opening left will permit the entrance of a poling board "B." Then the center breast board is cut through by drilling and the poling board driven a short distance.

A portion of the breast board is then removed and the earth under the poling board excavated. Other poling boards are introduced in a similar manner on each side and the excavation is widened and deepened.

As soon as the excavation has proceeded to such a point that the poling boards require support, temporary posts "C" are placed as shown in Figure 4. In sand there may be several sets of temporary posts used. Short posts are then progressively replaced by longer ones as the process of widening and deepening the heading proceeds. The face is held in place by breast boards "D" which are braced against the preceding set by braces "E." Where the soil will stand up for a short time the entire face to about a man's heighth is dressed down before placing breast boards. In sand, small breast boards must be placed as soon as the face is reached and these

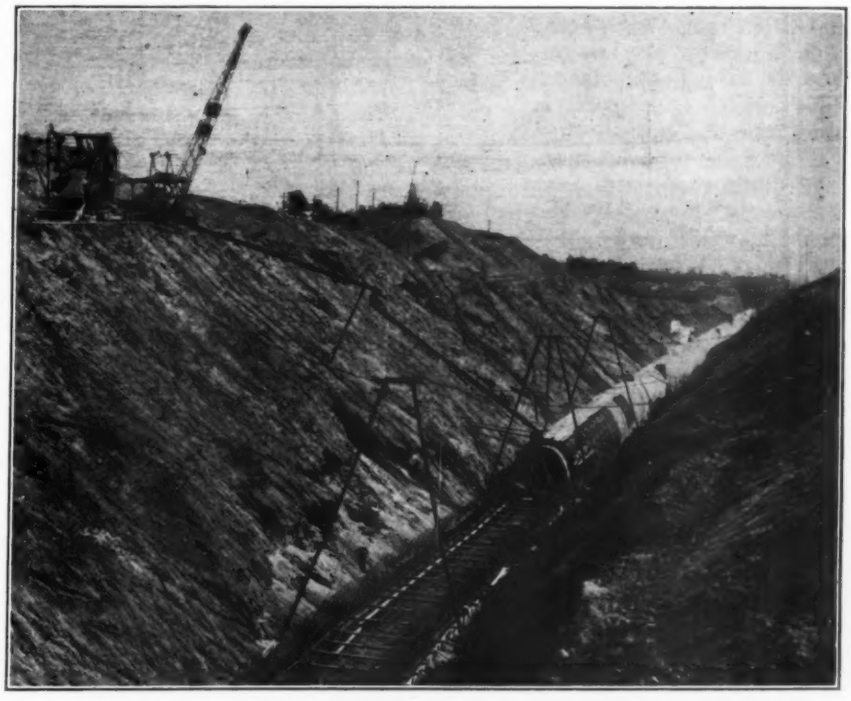


PLATE II—CONSTRUCTING SEWER IN 90-FOOT CUT, OCTOBER, 1925.

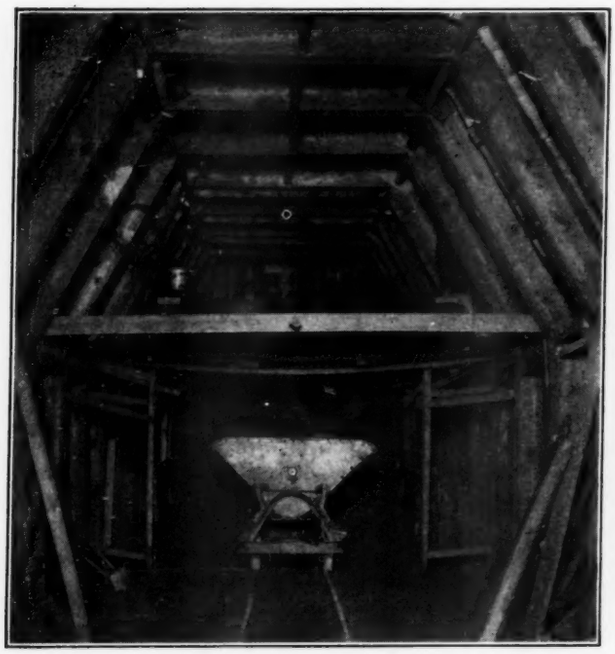


PLATE III—TIMBER IN 12-FOOT TUNNEL ON TANGENT.

PLATE IV—TIMBER ON CURVE.

must be gradually replaced by larger boards, as the face is widened and deepened. Three poling boards on each side of the top and eight along each sloping side are made fan shaped as shown in Figure 1 so that they will completely retain the earth as the area widens out.

Figure 5 is a transverse view of the heading. The left half shows the appearance after all poling boards have been placed. The next operation is shown on the right half of Figure 5. A trench is carried downward and progressively sheeted by the boards "G" and "H" braced by "J" until the sill "K" can be placed. After both sills have been placed the posts, segments and caps of the next set of timbering is placed.

Line is carried forward from several plumb lines suspended from sets to the rear. Grade is carried on each side of the tunnel by small white boards nailed to the posts at a predetermined number of feet above top of sill. As each sill is placed it is brought to proper elevation by sighting back along the grade boards.

Concreting was done by hauling the concrete in cars into the tunel from a mixer located outside, the track being elevated as much as possible above the floor of the tunnel in order to save handling. Wooden forms were used for the 12-

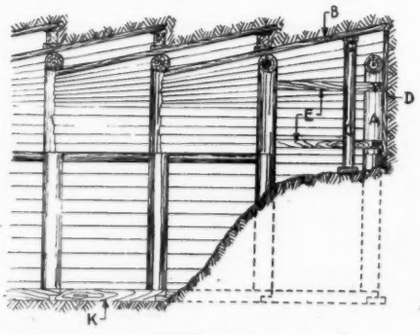


FIG. 1

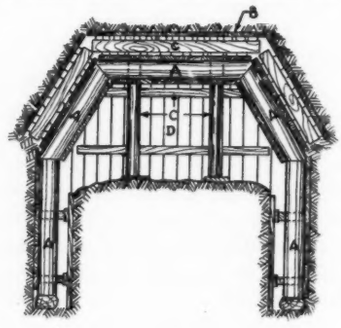


FIG. 2

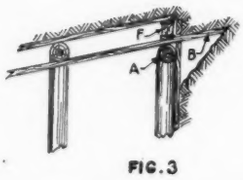


FIG. 3

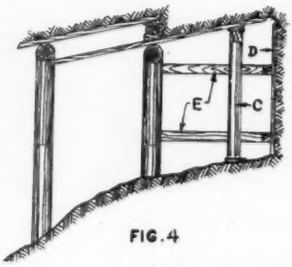


FIG. 4

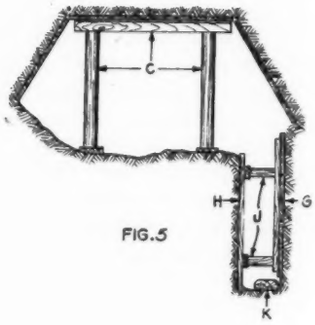


FIG. 5

PLATE VI—METHODS OF SHORING TUNNEL.

PLATE V—LOOKING OUT OF TUNNEL PORTAL.

foot tunnel and steel forms for the 8-foot tunnel. The entire space between the timbering and forms is filled with concrete, the concrete on top of the forms being shoveled into place and rammed back to fill the entire section between the forms and the timber work.

Approximate cost figures indicate that for the 12-foot tunnel the total cost of driving, including excavation, was approximately $54 per foot, of which cost $19 per foot was for timber. These figures do not include the contractor's profit. The approximate cost of concreting was $71 per foot, this being on the basis of $17 per cubic yard in place. The total cost for the tunnel complete was $125, not including contractor's profit.

Of the 8-foot tunnel section only about 500 feet out of a total of 2,300 feet has been completed. For this, 7x10 shafts were used, the total cost per foot of sinking the shafts being approximately $43. The approximate cost for driving, including labor and timber for the amount already driven and a proportion of cost for hoisting equipment, is $45 per foot, of which amount $8 is for timber.

On account of water bearing sand and gravel seams, it was necessary to install pumps at each of the two main shafts of the 8-foot tunnels. Hoists with approved safety devices were installed and operated by steam engines from the same boilers as the pumps.

Chicago Waste Disposal

The Chicago municipal garbage reduction plant disposed of 113,596 tons of raw garbage during 1924, as compared with 105,226 tons the year previous. The amount of garbage grease produced was 6,385,370 pounds in 1924 and 5,724,000 in 1923, and the revenues from the sale of it $307,288 and $232,839, respectively. On the other hand, the tankage produced in 1924 was 4,664 tons, sold for $24,717, as compared with 8,655 tons in 1923, sold for $42,776. Scrap iron recovered brought $1,172 in 1924 and only $629 in 1923. The total revenues from sale of grease, tankage and material recovered were $333,383 and $277,069, respectively.

The cost of operation in 1924 comprised $427,143 for salaries and wages, $66,703 for fuel oil, $18,342 for power and light, $46,289 for coal, $110,264 for supplies and repairs, $26,105 for removing dried garbage and rubbish; a total of $694,845, or $17,373 less than the year previous. This gives a total cost per ton of raw garbage of $6.117 in 1924 and $6.768 in 1923. There was therefore a net loss of $363,343, not including anything for interest and depreciation. During the year $51,304 was spent for additions to the plant, which is not included in the above figures. The average number of employees was 229.

The average price received for grease during the year was 4.76 cents a pound, for tankage $5.32 a ton, for rags $4.92 a ton, and for scrap iron $5.64 a ton.

"To Improve Contracting Service"

"To improve contracting service, to stabilize the business and procure the best results for the public—by gathering and making available for any of the parties interested all information concerning public works contracts, the bidders and those to whom the contracts are awarded" is the purpose of an organization incorporated in California under the name of "The Clearing Bureau of Contract Investigation," by eight surety companies in cooperation with the Contractors' Association of Northern California and the California Department of Public Works.

This bureau aims to "weed out the irresponsible contractor and to place the business upon a higher plane;" to gather and disseminate information in the interest of safer underwriting of contract bonds, procuring better bidders and contractors and better perfomance of contacts. Any person interested in public works contracts is entitled to service by the bureau free of charge. The cost of conducting the bureau is met by voluntary contributions from the surety companies.

The incorporators and board of governors are R. M. Morton, state highway engineer and director of public works, representing the public; H. E. Wood, superintendent of the bonding department, Aetna Casualty & Surety Co., representing the surety companies; and Earl G. Lloyd, manager of the Contractors' Association of Northern California, representing the contractors. H. J. Douglas, United Bank & Trust Bldg., San Francisco, is the secretary-treasurer.

Bronze Welding Cast Iron Pipe

In a paper entitled "Effect of Heat of Bronze Welding on Cast Iron Pipe", read at the November convention of the International Acetylene Association, A. R. Lytle, of the Union Carbide and Carbon Research Laboratories, Inc., stated the following conclusions:

1. Neither cast iron welding nor bronze-welding has any detrimental effect on the structure of cast iron pipe.

2. It is possible that with cast iron very high in phosphorous, the bronze-welding may weaken the

structure sufficiently to lead to failure, though this is doubtful.

3. Inasmuch as both welding with cast iron or with bronze strengthen the base metal at that point, it is more or less natural that line failures in overstressed pipe should occur just outside these altered zones.

4. It may well be that some of the failures occuring in welded gas lines have been the result of surface cracks or defects in the pipe. The influence of these cracks may be emphasized by the welding process.

Concrete Freezing Tests

Attempts have been made to study the effect on concrete of freezing and thawing by subjecting it to supposedly corresponding effects produced by sodium sulphate. The correspondence of effect, however, has not been proven and the Bureau of Public Roads has under way a series of tests in which concrete beams are to be actually frozen and thawed alternately and tested for modulus of rupture, in order to correlate the results of this test with those of actual freezing.

The materials being studied include trap rock, several grades of limestone including cherty limestone, limestone containing thin shale bands, etc., dolomites, soft sandstones, gravel ranging in quality from hard quartz to that containing relatively soft, easily disintegrated materials, an excess of flat pieces, shale, etc.; also both heavy and light-weight blast furnace slags.

It is believed that the results of these tests will clear up some doubtful points regarding the significance of the accelerated sodium sulphate soundness test and the value in general of certain types of materials as aggregate for concrete.

Wards Island for Treating New York's Sewage

Sewage from three boroughs to be treated on the northern part of this island if it can be recovered from the state, to which it has been leased. Reasons why this point was selected. Outline of the proposed plan.

The Metropolitan Sewerage Commissioner of New York City in 1912 reported on the sewerage of the greater city, one of its recommendations being the construction on Wards Island of a plant to treat the sewage of the northern part of Manhattan Island and of Queens Borough, and that of the Bronx west of the Bronx River. Wards Island belongs to the city but was leased to the State until 1962 for use as the site for a hospital for the insane, which now contains, with its staff, some 7,000 persons.

In order to carry out this plan, the city endeavored in 1924 and again in 1925 to secure state legislation releasing the state's rights in about 50 acres of the 243 on Wards Island, but the bills introduced failed of passage. In September of this year, Arthur S. Tuttle, chief engineer of the Board of Estimate and Apportionment, suggested to the Main Drainage Committee of that board that it urge that the matter be pressed at the next legislative session, accompanying his letter with a report by Kenneth Allen, sanitary engineer of the board. The suggested action was taken by the committee on October 15th.

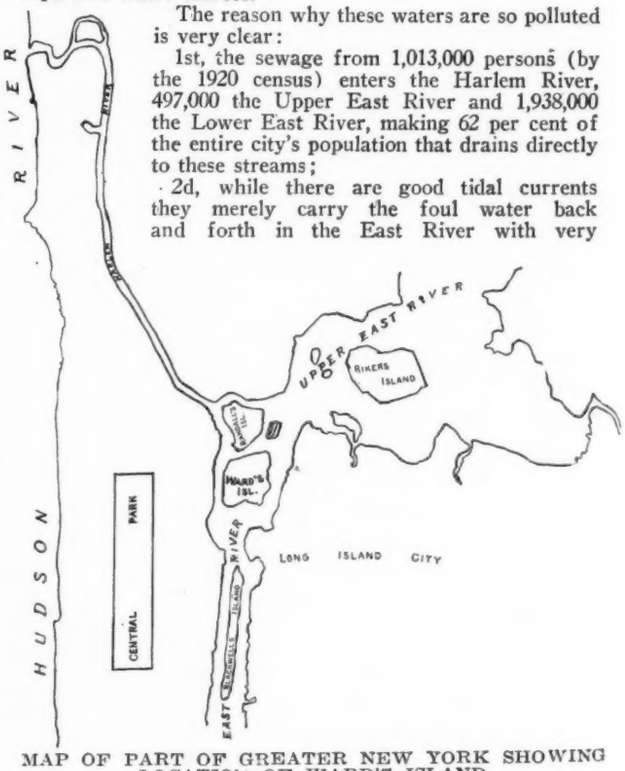
The reason for urgent action was explained by Mr. Allen in his report, of which the paragraphs of most general interest are given below.

The part of New York that is the most highly polluted of all its main divisions is the Harlem River,* and, next to that the East River. The best measure of this pollution is in the loss of dissolved oxygen which increases with increased pollution. While in the summer of 1909 the Harlem River contained 55 per cent. and the Lower East River 65 per cent. of the oxygen required for saturation, by 1924 this had fallen in each stream to 26 per cent. Moreover, there are times each summer when parts of the Harlem River are entirely devoid of dissolved oxygen and in one instance (September 13, 1921) this condition occurred in the Lower East River. Fortunately these periods of total depletion have been temporary and local, but with the general increase of pollution in both of these streams the danger of longer periods and more extended areas of total depletion with the production of wide-spread odor become more imminent. Experience in the past in the towns along the valley of the Passaic River and in the neighborhood of our own Gowanus Canal should be a sufficient warning to make sure that it is not duplicated in New York's more important water-courses.

The reason why these waters are so polluted is very clear:

1st, the sewage from 1,013,000 persons (by the 1920 census) enters the Harlem River, 497,000 the Upper East River and 1,938,000 the Lower East River, making 62 per cent of the entire city's population that drains directly to these streams;

2d, while there are good tidal currents they merely carry the foul water back and forth in the East River with very



MAP OF PART OF GREATER NEW YORK SHOWING LOCATION OF WARD'S ISLAND.

*The Harlem Riven forms the northeast boundary of Manhattan Island. It extends southeast from the Hudson River to the East River, receiving drainage of Manhattan on the west and Bronx Borough on the east. Harlem River, Lower East River (which separates Manhattan from Brooklyn and connects with New York harbor) and Upper East River (which separates Bronx Borough from Queens Borough and connects with Long Island Sound) all meet at Wards Island.

little resultant motion toward the bay, and in the Harlem River the tidal currents bring in water from the two ends that is already polluted; and,

3d, as the flow to and from the southern end of the Harlem River passes largely through the Harlem Kills and Little Hell Gate, there is a region of sluggish currents in the former stream west of Wards and Randalls Islands. In short, a large volume of foul liquid is poured into the East River at a point where it is already most highly polluted and where the opportunity for dilution with the cleaner waters of the ocean and Long Island Sound is least.

WHY WARDS ISLAND IS THE LOGICAL LOCATION FOR A DISPOSAL PLANT

Wards Island is most advantageously located as a place for disposal for several reasons. In the first place, it lies near the heart of this population of 3½ million persons whose sewage (as already mentioned) makes the adjacent waters the most foul of all the main branches of the harbor. Its proximity to this large and dense population makes for economy in construction.

The great sewers discharging at 106th and 110th streets from Manhattan, at Brook avenue from The Bronx and, in the future, at Winthrop avenue from Queens, all lie immediately opposite Wards Island, so that interceptors would be comparatively short and small in diameter;

2d, the effluent, purified by treatment and replacing the foul harbor water, would enter the stream midway between Long Island Sound and New York Upper Bay at a point where its beneficial effect would be most marked;

3d, the works would be on land now owned by the city and vacant, while removed from the highly developed and costly waterfront property of the three interested boroughs. Not only that, but the plant would be cut off from the greater part of the Island now occupied by institutions by the New York Connecting Railroad bridge;

4th, the effluent would be discharged by submerged outlets into the swift and deep waters of Hell Gate, where it would be immediately mixed and diluted with the (then) well oxygenated river water, which here attains a velocity four times a day averaging 8 feet per second.

For some or all of the above reasons it will be clear that Wards Island is a more desirable site for a treatment plant than can be found elsewhere. Rikers Island is less central, farther from the ocean (to which any residual impurities will ultimately have to travel) and will, in all probability, be required for the disposal of other large volumes from The Bronx and Queens. The cost of delivering sewage to this point would be very great. Randalls Island is more completely developed and is less favorably situated for both the collection of sewage and the discharge of effluent. Sunken Meadow is too restricted in size, less accessible and works at this location would entail much rock excavation, while the surounding waters, as in the case of Randalls Island, are not well adapted to receive the effluent.

DESCRIPTION OF WARDS ISLAND

Wards Island lies at the junction of the Harlem and East Rivers. The Harlem River Separates it from Manhattan on the west; Little Hell Gate (a shallow strait connecting the two rivers), Randalls Island and Bronx Kills lie between Wards Island and the mainland of The Bronx on the north; and the stretches of the East River known as Hell Gate, connecting the upper and lower sections of that stream, separate the island from the Borough of Queens on the east and south.

The area of Wards Island is about 243 acres. The land is arable and slopes gently from near high water to 20 or 25 feet above that level. Some 50 acres of the northeast portion cut off by the New York Connecting Railroad is practically free from improvements and it is this portion that would be most desirable as well as most available for purposes of sewage disposal. The sewage to be delivered there by 1960 would amount to about 187 million gallons per day; 69 million gallons per day from Manhattan, 93 million gallons per day from The Bronx and 25 million gallons per day from Queens. If this were given the complete treatment necessary at this point, the area actually required would be about half of that cut off by the New York Connecting Railroad, but to provide for dockage, transportation and contingencies it would be desirable to secure release by legislative action of at least 40 acres, together with easements for the tunnels required to bring the sewage from Manhattan and The Bronx.

Objection has been made by the State Hospital Commissioners to the release of this land, for, they say, in spite of the establishment of new institutions elsewhere in the State, the Wards Island hospital is becoming more and more overcrowded, while the welfare of the inmates demands this area for outdoor occupation. This appears to be a reasonable contention and if legislation is to be sought to recover these 40 or 50 acres for the pressing needs of sewage disposal, some way of relief from the present congestion should be assured. I think it will not be questioned that suitable or superior sites can be provided elsewhere for hospital purposes, but there is no such choice in the case of a site for sewage treatment. It may be said, however, that such a plant could not be built in a day. It would be twenty years before the entire area would be required, so that construction could be by installments and the reduction in the use of the land by the hospital could be progressive. By carrying out this program the land to be released need be but 20 acres on January 1, 1928, followed by 10 additional and contiguous acres January 1, 1935, and 10 more January 1 1955.

OUTLINE OF PROPOSED PLAN

It is proposed to bring the sewage to the island from each burough by a deep tunnel, constructing those from Manhattan and The Bronx first. To avoid duplication of pumping plants the sewage, after passing through grit chambers, will flow by gravity to a pump well on the island, from which it will be raised to the level necessary for treatment, details for which should be worked out and adopted only after careful study and experimentation. The effluent will pass to Hell Gate through submerged outlets and the sludge, after concentration, either dumped at sea or dried as fertilizer.

The construction of interceptors, grit chamber and the tunnels leading to the island could be advanced without delay, followed by that of the main pumping station, but before undertaking the construction of treatment works it would be desirable to carry out tests of the quality of sewage to be treated, measurements of its volume and various experiments to determine the best method of handling the sewage and sludge.

While this experimental work is progressing and the interceptors, grit chambers, tunnels and pumping station are being constructed, the plans for the works would be worked out in detail, guided by the results of the experiments, so that by the end of two or three years the work of constructing the plant could be started.

Works to serve the tributary population in 1960 would have a capacity to handle an average of between 150 and 200 million gallons of dry weather flow per day, and, in order to observe the effect of treatment on the harbor water and to take advantage of the most recent methods of disposal as they may develop, it would seem desirable to carry out the work in, say, three installments. The first installment could probably be brought into service by 1930 and experience gained in its construction and operation availed of in the construction of the later work. The second installment would be placed in service in about fifteen years and the third in about 30 years.

The population served in Manhattan and The Bronx, 741,000 in 1920, is estimated at 1,052,000 in 1960, all the increase being in The Bronx. It is doubtful whether, with the growing tendency to decentralize in the more congested districts, the population of these boroughs to be taken care of here will ever greatly exceed one million, but if sewage is brought to the plant from Queens, it is probable that the tributary population, which will have increased from 37,000 in 1920 to 170,000 in 1960, will be subject to a still further increase. The densities* in these three drainage areas in 1960 will be as follows:

	Manhattan.	The Bronx.	Queens.
Net acres	1,364	3,744	4,682
Population	421,000	631,000	170,000
Density	308	168	36

With the great capacity for development in Queens still remaining, it does not seem unreasonable to anticipate in the far future a considerable increase. It is believed the

*Persons per acre, exclusive of parks and cemeteries.

average density may eventually reach 100 persons to the acre, or its equivalent if day population is included. If the sewage were increased in nearly like proportion it would be three times that expected in 1960, or 75 instead of 25 million gallons per day. The total amount delivered to Wards Island would then be 237 million gallons per day, as follows:

From Manhattan	69 million gallons per day
From The Bronx	93 million gallons per day
From Queens	75 million gallons per day
Total	237 million gallons per day

This could all be treated by the activated sludge process on the 40 acres assumed to be available on Wards Island without undue crowding. With improvements in methods of treatment, less and less area has been demanded in the past and any future requirement will doubtless work in the same direction. Moreover, any less thorough treatment, if permissible, would require less area, while there is the possibility of further reduction with the greater restriction in the use of water through the more universal introduction of meters. There is, therefore, every reason to believe that the 40 or 50 acres of Wards Island lying to the northeast of the New York Connecting Railroad will always be sufficient to meet the needs of sewage disposal.

THE ALTERNATIVE

If Wards Island should not be available for sewage disposal purposes, a plant will have to be built on some other island at higher cost and under less favorable conditions, or else there will have to be separate plants in the three boroughs, involving the use of many acres of valuable waterfront property, the certain opposition (even if only on sentimental grounds) of interested and perhaps influential property owners, and the inevitable added cost of operation where three pumping stations and treatment plants are involved instead of one.

Marl Sewage Treatment at Ashland*

Early in July, 1924, Ashland installed equipment at its disposal plant for treating sewage by the so-called Travers Marl process. As treatment in this manner was undertaken without the knowledge or approval of the Ohio State Health Department, an immediate investigation into the method was begun upon learning of its inception.

Prior to its installation of the Marl process, the disposal works consisted of 3 grit chambers, 6 septic tanks, a cascade aerator, 7 filter beds, one of which is used for a sludge drying bed. The plant was seriously overloaded as shown by the following quotation: "the serious overloading of the plant which has obtained for a number of years has rendered it impossible to produce satisfactory efficiency and physically impossible to filter the sewage reaching the plant."

The following description of this process as employed at Ashland is given:

"On July 14, 1924, a preliminary investigation was made of the so-called marl process for treating the sewage of the city of Ashland. It was learned that the process was similar to the chemical precipitation process, the precipitant used being a mixture of finely divided marl, hydrated lime and granulated iron sulphate mixed in the proportions of 81.2%, 16.2% and 2.6%, respectively. The existing units of the old treatment plant were used for settling and filtering the chemically treated sewage. The chemicals were mixed by manual labor in lots of 308 pounds in a container similar to a mortar box by means of a hoe and shovel. The compounded mixture was fed into the crude sewage by dropping it through an improvised manhole on the main sewer at a constant rate by means of an electrically driven Gauntt dry feed machine. The feeding machine was located in a building that was especially constructed for the purpose in the northwest corner of the treatment plant property, immediately over the 15 inch trunk sewer leading to the sewage plant. The building is a frame structure about 20 feet by 25 feet in plan and also serves as a store-house for chemicals and tools as well as a place for mixing the so-called coagulant.

"There were no means provided for measuring the flow of sewage or adequate means of mixing the coagulant with the sewage other than that obtained by the velocity of the sewage flow in the sewer. The chemical coagulant was also fed at a constant rate without regard to fluctuations in flow of sewage."

Two detailed studies of the process were made in July and September, 1924. The conclusions drawn from the studies are given (in part) as follows:

"The so-called marl process as employed in treating the city sewage of Ashland is similar to the chemical precipitation process. The precipitant used was a mixture of marl (Calcium carbonate) hydrated lime and granulated iron sulphate.

"The use of lime and iron sulphate as a coagulant or precipitant is not new as it was used more than fifty years ago in Europe and to some extent in later years in this country but because of the excessive cost of the treatment and the increased difficulty encountered in handling the excessive sludge deposits and oxidizing the tank effluent the process has gradually ceased to be a recognized method of treating sewage."

"* * * * It is impossible for the marl to enter into the chemical reaction between the lime and iron sulphate because of its chemical composition and insolubility in alkaline water. The only beneficial effects that may be derived from the use of the marl would be of a mechanical nature in that the inert material if properly mixed with the sewage may assist in removing some of the finely divided solids while it was in the process of settling in sedimentation tanks. The marl may also have a direct bearing on the character of the sludge in that it would serve as a diluting agent for reducing the organic concentration of the sludge deposits.

"The efficiency of the marl process as determined by visual observations and analyses of the composite samples of the tank effluent indicated that the quality of the treated settled sewage was not superior to that ordinarily secured from a properly operated plain sedimentation tank. * * *

"The process did not produce a tank effluent of such a quality that it could be passed through the existing units of sand filters. * * *

"The process produces excessive sludge deposits as indicated by the rapid filling of the settling tanks

*From a special report, by the State Department of Health of Ohio, on sewage treatment at Ashland, Ohio, as abstracted in "Public Health Engineering Abstracts" of the U. S. Bureau of the Public Health Service.

as observed at the time of the second study. The quality of the partly dried sludge as observed by physical examination indicated that it was similar in character to chemically precipitated sludge. It was very compact and sticky and had considerable odor."

Utilization of Sewage Sludge

Investigation of value as fertilizer and methods of dewatering and preparing for sale. Digesting activated sludge. Extensive demand for fertilizer.

The committee on sewage sludge of the American Public Health Association submitted a report on the utilization of sludge at the October convention. A few days later the same report was submitted to the American Society for Municipal Improvements by the chairman of the committee on sewerage, Samuel H. Greely, who was also a member of the committee of the A. P. H. A. The report is as follows.

The outstanding features of the progress made during the year may be briefly stated:

Increased interest in the use of sewage sludge on the part of the agriculturist and fruit grower. Remarkable demand upon the part of golf clubs, flower growers and fertilizer manufacturers for the organic nitrogen in the sludge when reduced to a dry basis so that it can be properly handled. The cities of Rochester and Baltimore are disposing of the sludge from their hydrolytic and Imhoff tanks, after air drying, to neighboring truckers and fruit growers who haul it away and pay something for each load. The North Shore Sanitary District near Chicago is paid $100 per year by a farmer for the privilege of removing and using the dried Imhoff sludge from the drying beds of three separate sewage disposal plants which serve a very considerable population. Activated sludge, when properly prepared by drying and grinding, is sought by many different types of users.

SPECIAL MARKETS FOR SLUDGE

The Milwaukee Sewerage Commission, with the co-operation of the Sanitary District of Chicago, has, for the past two seasons, distributed prepared activated sludge, free of cost, for trial to many golf clubs in the Detroit, Cleveland, St. Louis, Minneapolis and Milwaukee districts —57 in all. In the majority of cases, the clubs have tried to get sufficient sludge this year for their total fertilizing needs but, little being available, their requests could not be complied with. The Milwaukee Sewerage Commission has also distributed to many flower growers in Illinois, Michigan and Wisconsin the prepared sludge with the result that a very considerable tonnage has been requested by this type of user. For 18 months truckers in large numbers have been attempting to secure activated sludge without success because it has not been manufactured in sufficient quantity.

The investigations so far conducted on the fertilizer value of activated sludge have been broad and have embraced the feeding of many types of ground growing staple crops, such as corn, tobacco, potatoes, tomatoes and cereals. In most cases, the several types of ground and crops have satisfactorily responded. For the growing of lawn and bent grass it has been especially successful. It proves better than sodium nitrate in that a surplus does not burn the grass and there is a very decided residual value in the sludge which is not in the nitrate. It is better than manure in that the plant food is more concentrated and contains no harmful seed to inoculate the soil, or injure the grass.

The best market, however, is with the fertilizer manufacturer who uses it as a filler to supply the organic nitrogen needed in the best complete mixture. Synthetic and mineral nitrogen are great plant foods but are not equal to organic nitrogen which has for years been largely supplied by the packing house industry in the form of tankage and which, since the war, has been converted largely into live-stock food.

The production of activated sludge to date has been very small and has been practically confined to the Calumet and Maywood sewage-works of the Sanitary District of Chicago and to the plant of the city of Houston, Texas. These plants have produced approximately 40 to 50 tons per month, although not continuously. The city of Houston has sold some of its sludge for $12 per ton f.o.b cars at the sewage-works. The Sanitary District of Chicago has received for its sludge in 100-lb. bags $22.50 per ton f.o.b. cars near works.

The Milwaukee Sewerage Commission will not be ready to begin the production of the dried sludge from its plant until late in October. The indications are that from 1¼ to 1½ tons of dried sludge will be produced from 1 m.g. of Milwaukee sewage or approximately 100 tons per day. Provision has been made to store the dried sludge through the off season (from May to October) in a substantial storage building of 25,000 tons capacity. By this means the sludge can be held for delivery when the demand is greatest and the price the highest.

DEWATERING

For the purpose of dewatering the sludge and preparing it as commercial product, demonstration plants have been conducted at Pasadena, Houston, Milwaukee, Indianapolis and Chicago. These plants have embraced pressing, filtering and drying. The McLaughlin filters were used at Houston and Pasadena; the Worthington, the Berrigan improved press and the Simplex press at Chicago; the Oliver continuous filter at Pasadena, Milwaukee and Chicago, and the American continuous filter at Indianapolis, and, on a small scale, at Chicago. Milwaukee has built and Indianapolis has under construction the most complete dewatering plants. The Oliver continuous filter and the Atlas dryer are to be used at Milwaukee and American filters and Bonat dryers are being installed at Indianapolis. It is felt that the

problem demands considerably more research before standardizing upon any one type of dewatering plant or equipment.

Sulphur, alum and sulphuric acid have been successfully used in assisting the coagulation of sludge preceding filtering or pressing. Chicago appears to secure the best results from alum, Houston from sulphur, Milwaukee from sulphuric acid. Recently, Chicago has experimented with ferric chloride which appears to be more efficient but more expensive so that its use might not be warranted except in an emergency. Neither in Chicago nor in Indianapolis has it been found necessary to heat the sludge artificially prior to dewatering during the winter months whereas heating has been found necessary in Milwaukee to get the most efficient results.

It therefore appears that each situation of considerable magnitude must, at present at least, be given separate study and investigation before any final determinations as to the best method for dewatering the particular sludge in question. As yet recovery on a small scale appears too costly a procedure. Several tests are now being conducted, with considerable progress, upon the possibility of digesting activated sludge by means of single or two-storied tanks.

UTILIZATION OF ACTIVATED SLUDGE

As a temporary measure, Indianapolis is digesting activated sludge in the same tanks with primary sludge produced by fine screens and rapid settling. This mixture of raw and activated sludge, when inoculated with partially digested sludge, produces very rapid gasification and complete digestion within a relatively short period. In the design of the dehydration plant at Indianapolis, provision is made for the drying of digested sludge which is expected to be the ultimate means of disposing of primary sludge composed of fine screenings and sludge continuously removed from preliminary settling tanks. The drying plant at Indianapolis is practically completed. The development of the sludge filter plant, except for the installation of one full-sized American continuous unit, will be delayed until the economic value and the cost of dehydration are more completely established.

Dr. Imhoff, in the Ruhr District, and the engineers of the Sanitary District of Chicago are discharging the excess activated sludge in the sludge or bottom chamber of Imhoff tanks where it settles and mingles with the digesting primary sludge. Digestion has taken place. While additional sludge capacity is required in the primary tanks, this combination of Imhoff tanks followed by activated sludge may have possibilities and offers a way of solving the sludge problem both for small and large installations. Further investigation is needed. Dr. Imhoff proposes, in the activated sludge plant he is now designing in the Ruhr District, to dispose of the sludge in primary digestion tanks and utilize the gases formed by the digestion process as power for compressing the air for the purification process. If this proves successfull, it will be a long step forward both in reducing the cost of purification and the cost of disposing of the sludge.

In England, sewerage-works engineers have been interested in the commercial utilization of sewage sludge for many years. The late Mr. Garfield, at Bradford, used to ship the dried sludge to Florida in shiploads. Mr. Hart, in Leeds, has pressed the precipitated sludge and sold it to the neighboring farmers. Mr. Watson at Birmingham has also carried on commercial disposal of digested sludge. A portion of the precipitated sludge from the Davyhulme Works at Manchester has been reduced to dryness on steam-heated steel plates and sold to farmers. Birmingham has recently been disposing of the sludge from its drying beds by delivering it to a nearby fertilizer manufacturer who uses it as a filler in mixed fertilizer. An abandoned aerodrome furnishes a convenient factory. Many other English cities are using some method of disposing of their sewage sludge to increase the value of neighboring farms. In the larger works, the practice of dumping wet or press cake sludge upon land and plowing it in is gradually being abandoned in England, although for the small works it is still a very common method.

The thought is somewhat prevalent that if the activated-sludge process of sewage treatment becomes broadly used on a large scale, the production of the fertilizer from this source may cause a decrease in selling price. This may be a possibility but, as the demand now exists, there are few sources from which this demand for organic nitrogen can be supplied. If, after continual trial, the activated-sludge product meets the requirement it now promises to meet, the indications are that a market can be found at a price which should cover the cost of preparation.

At the present juncture, your committee urges caution in the consideration of plans for new projects. As a rule, financial considerations are foremost. While Milwaukee, Chicago, Indianapolis, Houston and other cities are carrying on research and are operating large works, the knowledge obtained must be applied to a given problem, whether large or small, by experienced engineers. The economies effected, if any, may prove available only on the large scale.

The committee realizes that this report may be deserving of criticism because of the prominence given to activated sludge. The reason is that this character of sludge is of recent origin. Much research has been and is being carried on to determine the best methods for handling it and those particularly interested are entitled to such facts as the committee has been able to accumulate.

Fifty-Year Pumping Station Record

The report for 1924 of the Milwaukee municipal water works contains the following interesting information concerning one of its pumping stations:

On September 14, 1924, North Point pumping station completed fifty years of continuous operation. During this entire period there was no break-down at the pumping station to an extent that the service was crippled. This station was originally built to house two pumping engines and four boilers. Additions were made from time to time during the past 50 years so that the present structure now houses eight pumping engines and nine boilers. Neverthe-

less it is quite remarkable that one pumping station was able to supply the needs of the city until the population supplied had passed the half million mark. The metering of all services, thereby eliminating all unnecessary wastage of water, made this remarkable record possible.

The water end of pumping engine No. 4 will require extensive repairs during the coming year. This pump has been in continuous service for 32 years. The original pump plungers are badly scored and must be replaced with new plungers. All of the brass valve seats have been refaced so often that they can no longer be refaced and new valve seats will have to be provided; also a complete set of new valves. When all of these repairs have been made this pumping engine should be good for at least 20 more years of service, as the steam end was completely overhauled in 1921. The cost of doing this work is estimated at $12,000.

Chicago Water Works Notes

Some details of maintenance—Cutting large mains, use of Leadite, pressure control, stopping underground leakage, fire hydrant damages.

The following paragraphs are excerpts from the reports of several divisions of the Chicago Department of Public Works for the year 1924.

CUTTING LARGE MAINS

The cost of cutting 36″ and 48″ water pipe was reduced to a minimum and delays caused by waiting for pipe to be cut were eliminated by using a pipe cutting machine. 23 large pipe cuts were made in 1924 by machine at a cost of $499. If these cuts had been made by hand it is estimated that the cost would have been $1,248, thus showing a saving of $749. The use of the cutting machine not only saves in the cost of labor but also reduces to a minimum the amount of pipe which must be scrapped from cut pipe.

USE OF LEADITE

1,867 feet of 12″ pipe were laid in Garfield Blvd. from Morgan Street to Union Avenue. The joints were made with Leadite at a total labor cost of 30 cents per foot, which is about one-third of the cost where lead joints are made. There is a further saving in the cost of the material used, Leadite being cheaper *per joint* than lead. The pipe was tested to a pressure of 125 pounds per square inch before the ditch was backfilled and an examination made of the joints, which showed that 137 of the 146 joints were leaking slightly, the leakage being at a rate of 2,900 gallons per day. A test made two weeks later showed no leakage, indicating that the leadite joints had completely tightened up.

PRESSURE CONTROL

A system of pressure control on the connections from the feeder mains has been in operation for several years, and by this control it is possible to decrease the pressure adjacent to and raise the pressure at points more distant from the pumping stations. This system of control tends to equalize the pressures throughout the entire system.

Without this method of control in operation, many sections of the City would be without water entirely and others would have very little pressure.

To aid in the pressure control and give the engineers daily information as to the pressure conditions, sixty-two pressure gauges are maintained in fire engine houses and the pumping stations throughout the City. Records from these gauges are mailed daily to the Assistant Engineer of the district, who has pressure curves plotted for each weekly period.

UNDERGROUND STREET LEAKAGE

For the past nine years it has been the practice of the engineers of the Water Pipe Extension Division to inspect and test for leakage all hydrants, valves, water mains and services in the street up to and including the stopcock at the curb in connection with street paving work. Not only are the tests made and the leakage measured, but the leaks located and stopped before the new pavement is laid.

In 1924 the Street Improvement parties of the three engineering districts made careful leakage tests on 49.92 miles of pipe in streets which were up for paving. These tests were preceded by an inspection of the service pipes and by recommendation for cutting off and abandoning of services which would not be used in the future. After the inspection and the engineers' tests, orders were issued for work to be done to put the mains, hydrants and valves in first-class condition.

The leakage measured in streets up for pavement amounted to 580,439 gallons per day and the amount stopped was 518,456 gallons per day.

From 1916 to the present, 546.16 miles of mains have been covered by street improvement tests. This is 17.2 per cent of the entire mileage of mains in the water system.

Based upon a measured underground leakage of 7,620,543 gallons per day in the 546.16 miles of mains tested, the indicated leakage from mains and services in the street up to and including the stopcock at the curb is 44,313,000 gallons of 5.24 per cent of the average daily pumpage of 845,000,000 gallons. 5,605,885 gallons per day of leakage measured and stopped by special tests and which cannot be distributed is not included in this figure.

PITOMETER TESTS

The following tests are made by pitometer: The feeder mains throughout the system are tested once each year to determine the conditions under which same are operating; tests in sections where house to house plumbing inspections and plumbing repairs are to be made, and tests in square mile areas to determine the conditions within the square mile and to obtain information from which future mains are designed.

The testing of all pumping engines for slip at intervals of about five weeks and the checking of all water measuring devices for accuracy which are installed in the pumping stations.

The making of fire flow tests throughout the City from which recommendations are made to put the system in condition to meet the Fire Underwriters' requirements.

FIRE HYDRANTS DAMAGED

The increasing use of motor vehicles has greatly increased the number of broken fire hydrants and it has been found necessary to establish a special section to look after such cases and if possible make collections to reimburse the Water Fund for the expense involved. This work has been handled under the personal supervision of the Assistant Superintendent of the Division with the result that during the past six months bills in excess of $14,000 have been rendered which have either been paid or referred to the Law Department with such information as practically makes collection by suit a certainty. In this work we have had the co-operation of both the Police and Fire Departments. The value of all damage approximated $75,000 for the year To illustrate the extent of damage it may be stated that on one day, December 26, 1924, there were twenty-five hydrants broken.

CHLORINE BOOTHS

The chlorinating equipment at the pumping stations being inadequate to take care of the quantity of chlorine required for proper purification of water, and obsolete from the standpoint of operation, safety, accuracy and reliability, it was decided to rehabilitate the installations at all stations, provide suitable rooms and housings for tanks and machines, eliminate difficulties in handling and storage of cylinders, and provide against stoppage of chlorine application by a duplicate system of headers, machines and booths.

Exhaustive studies, field investigations and plans were made to determine the best available locations and the best type of layout to be used.

The capacity of equipment was based on a chlorination rate of .75 part per million with machines rated at 300 pounds per 24 hours. Suspended platform scales for measuring weight of chlorine are located one at each machine. The scales have a capacity of ten 100-pound chlorine tanks, and have platforms flush with floor, eliminating the lifting of the tanks when they are replaced.

For each of the chlorine machines required to carry the load of the station there is a duplicate machine in an adjacent booth. All machines are connected to a universal header, which is also in duplicate. This permits any machine or group of machines in one booth to be shut down, and by operating the reserve machines through the header an uninterrupted flow of gas is assured. Exhaust fans are provided which in case of emergency will give one air change per minute in any booth.

CAST IRON WATER PIPE

The cast iron water pipe inspected amounted to 24,611 tons, of which 18,729 tons were accepted and 5,882 tons or 24% were rejected. The accepted pipe was distributed between the City of Chicago and the special assessment contractors, the city receiving 17,018 tons and the special contractors 1,711 tons. There were 42,705 pieces of pipe inspected.

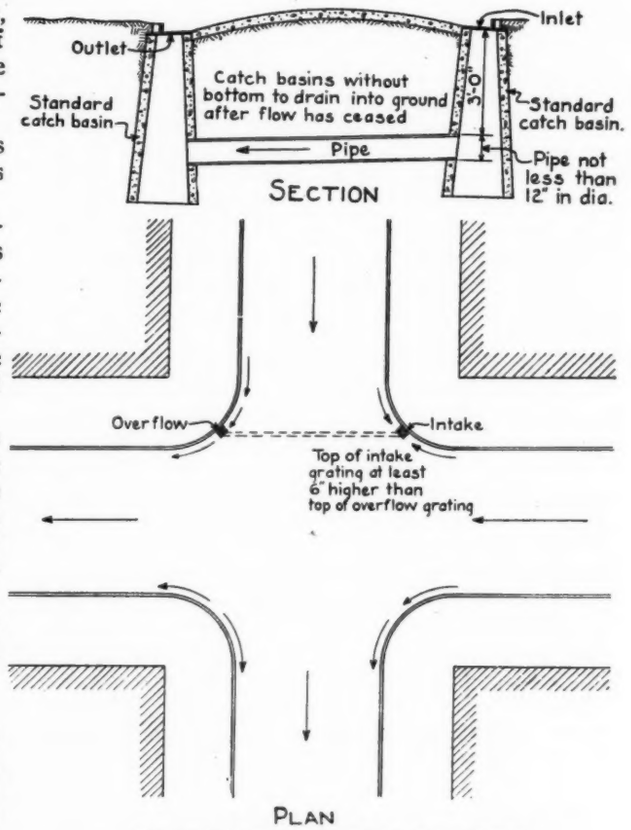
Special castings inspected amounted to 7,310 pieces of which 6,247 pieces or 2,005 tons were accepted and shipped. The cost of specials was $254,635.00.

Gutter Drainage at Street Crossings

Where there are no sewers to receive surface water, some provision must be made for carrying the gutter flow across intersecting streets. This may be a depression in the roadway surface, which is very inconvenient and even dangerous for vehicles; or the gutter may be continued across the roadway as a box with a cover flush with the road, or a pipe buried just below the surface. Either of the latter creates a starting point for pavement disintegration and is apt to stop up with dirt, leaves and other debris and to freeze in winter.

Beloit, Wis., has used the plan shown in the accompanying illustrations. A standard catch basin is placed in the curb on each side of the obstructing roadway and these are connected by a pipe not less than 12 in. diameter and with at least 3 ft of cover. The bottoms of the catch basins are not made watertight and the water held in them after a storm seeps away. There has never been any trouble with freezing in Beloit; but where the soil is very non-porous and water will not soak into it there might be trouble from this cause.

If at any future time storm sewers should be laid in streets provided with this construction, the basins could be connected with such sewers.



UNDERGROUND GUTTERS IN BELOIT.

PUBLIC WORKS

Published Monthly
at 243 W. 39th St., New York, N. Y.

S. W. HUME, President J. T. MORRIS, Treasurer

Subscription Rates
United States and Possessions, Mexico and Cuba $3.00 year
All other countries ..... $4.00 year
Single copies, 35 cents each

Change of Address
Subscribers are requested to notify us promptly of change of address, giving both old and new addresses.

Telephone (New York): Pennsylvania 4290
Western Office: Monadnock Block, Chicago
A. PRESCOTT FOLWELL, Editor

CONTENTS

EFFECT OF PLEASURE TRAFFIC ON BRONX PARK ROADS. Illustrated. By L. G. Holleran... 425
To Test Thin Paving Brick..... 427
ADMINISTRATION AND LOCATION OF STATE HIGHWAYS. Illustrated. By George F. Syme.... 428
ALL-WESTERN ROAD SHOW. Illustrated. By Charles W. Geiger..... 432
TUNNELING FOR SEWERS IN ST. PAUL. Illustrated. By George M. Shepard..... 434
Chicago Waste Disposal..... 437
To Improve Contracting Service..... 437
Bronze Welding Cast Iron Pipe..... 437
Concrete Freezing Tests..... 438
WARDS ISLAND FOR TREATING NEW YORK'S SEWAGE 438
MARL SEWAGE TREATMENT AT ASHLAND. 440
UTILIZATION OF SEWAGE SLUDGE..... 441
Fifty-Year Pumping Station Record..... 442
CHICAGO WATERWORKS NOTES..... 443
Gutter Drainage at Street Crossings. Illustrated..... 444
EDITORIAL NOTES..... 445
Accurate Subgrading—For Better Low-Cost Roads—Road Wear by Pneumatic Tires
Allied Architects Association of Los Angeles..... 446
WISCONSIN PENETRATION ROAD CONSTRUCTION. Illustrated. By F. H. A. Nye..... 447
Paving in Birmingham..... 448
GAS HAZARDS IN STREET MANHOLES. Illustrated 448
GRAVEL ROADS IN MISSOURI AND NEW MEXICO 450
Jacksonville Water Supply..... 451
DISPOSAL PLANT RECORDS..... 452
Removing Ice from Waltham's Streets..... 452
Paving in Imperial County 453
HIGHWAY RESEARCH MEETING..... 453
YEAR'S WORK OF THE BUREAU OF PUBLIC ROADS 458
Prize Essay on Improved Highways..... 460
Brick Paving in France..... 460
Highway Program for Cuba..... 460
Chlorination Process Patent..... 460
RECENT LEGAL DECISIONS..... 461

Accurate Subgrading

Highway contractors have been objecting recently to insistence by state highway departments that when the plans call for six inches thickness of concrete they mean that the thickness shall at no point be less than this. They claim that this is defrauding the contractor; that there should be a tolerance of a half inch (more or less) and that six inches should be the *average* thickness.

If the specifications state that the thickness shown on the plan is in every case the minimum to be provided at that point, we can see no injustice whatever. Even if it is not so stated, we believe that it is plainly implied that this thickness is needed to provide the desired strength and that less than this will introduce points of objectionable weakness wherever it occurs. It is up to the contractor to keep at a minimum, by his methods of construction, any excess thickness. In fact, there are good engineering reasons for insisting that the thickness do not at any point exceed the minimum by more than say five per cent.

Ten or fifteen years ago, when both subgrade and concrete were surfaced with shovels, this would have been difficult of attainment. Today it presents no difficulties to a well-equipped contractor. Not only is the concrete accurately surfaced with either a surfacing machine or a template tamper, but subgraders are available for bringing the subgrade to an equally accurate surface; or with sufficient care this can be done by hand, a subgrade template being used.

As to the cost of this, it may be a minus quantity. Without accurate subgrading there may easily be an excess of an inch over half of the pavement or an average of a half-inch on the entire area. On a day's work of say 500 feet of 20-foot pavement there would therefore be a saving of more than 15 cubic yards of concrete. Or, expressed in another way, the length laid would be increased 40 feet. Use of a subgrader for two or three hours a day would probably suffice to secure this saving. In these days of competition and close figuring, a possibility of saving six or eight per cent. and at the same time giving better satisfaction to the engineer should receive careful consideration.

For Better Low-Cost Roads

We were glad to learn that the National Research Council had appointed a committee to study earth and other low-cost roads, and that this committee has begun a thorough investigation of the subject. As stated by the chairman, Prof. S. S. Steinberg, in his report this month (see page 457), 85 per cent of the roads of the United States are still earth roads, and it will be years before this figure can be greatly diminished. Considering only the Federal aid roads, more than two-thirds of those completed to date are dirt, sand-clay and gravel.

This last statement would seem to indicate that the Bureau of Public Roads recognizes the

importance of these low-cost classes of roads as secondary highways. But other considerations cause us to doubt this. If it does, why does it devote so little of its attention and resources to an endeavor to develop improved methods of constructing and maintaining such roads? Of a list of 42 bulletins and circulars published by the Bureau, only two refer to earth roads—and both of these are out of print. The last annual report of the Bureau refers to some field experiments made on dirt roads and co-operation with the University of Georgia in sand-clay and top-soil investigations; but, encouraging as this is, it is but a drop in the bucket of what is needed.

Not only do earth and gravel roads constitute by far the largest percentage of highways in most of the states (in at least eleven of the states they constitute more then 99 per cent), but the states where such percentages are largest are generally those least able financially to make their own investigations and develop the methods whereby the small sums at their disposal can be spent most effectively in improving their highways.

Moreover, cement, asphalt and brick manufacturers can and, greatly to their credit, do carry on extensive and most effective investigations for determining how their respective materials can be used most satisfactorily in road construction, and would undoubtedly do even more of this if the Federal government should cease its activities along these lines. But no class of manufacturers seems to have yet recognized any commercial benefit to themselves in studying dirt roads. (Here is a field for the manufacturers of graders, scrapers and the like.) For this reason it would seem to be all the more the duty of the Bureau of Public Roads to devote much more attention to dirt roads than to the hard-surface roads, on investigating which millions have been spent.

The chief of the Bureau, Thomas H. MacDonald, said a few days ago that the Bureau recognized this subject as being the most difficult that it had yet tackled, but that a beginning had been made along several lines. It is to be hoped that the difficulty will act as a spur to the investigators, and that, instead of being discouraged, they will accept the challenge and devote their fullest abilities to developing at an early date methods that will prove of practical use to dirt road builders everywhere, from hot and arid New Mexico to Maine with its long, cold winters, and the northern Pacific states with their hundreds of inches of rainfall.

Road Wear by Pneumatic Tires

In at least one report on results from test roads made during the past year or two the statement was made that, while the deterioration of the test road due to trucks was very apparent, none that was noticeable could be attributed to vehicles using pneumatic tires. Since most roads carry both classes of vehicles, however, a service test of this matter is not readily obtainable.

An opportunity for such test is offered by the Bronx Park Driveway, on which no trucks or other commercial vehicles are permitted, but which carries a very intense traffic. We accordingly asked the deputy chief engineer of the parkway commission to state what the effect of such traffic has been, and this he tells in an article in this issue. In brief, his conclusion is that so long as either bituminous concrete or asphalt block is covered with a flush coat of asphalt there is no wear; but if any mineral aggregate or joint filler is exposed, deterioration begins.

This he explains by the suction of the pneumatic and balloon tires. We are inclined to question this explanation, and attribute the deterioration instead to abrasion. In the first place, we question whether the suction exerted is sufficient to overcome the cementing power of the asphalt. Also, we find that where traffic on brick and even on granite block is limited to pneumatic tires, there is a very considerable wear. An instance is the brick paved driveway to the Long Island Railroad waiting room, in New York City, which is used almost exclusively by taxis, thousands of which each day track each other through a narrow entrance. These wear two ruts at the rate of ¼ inch or more of depth a year, the brick being renewed when the ruts become dangerous. A less pronounced wear of granite blocks can be seen on Bloomfield Ave. in Montclair, N. J., where trolley landing platforms confine to a single lane traffic which is intense and contains few vehicles not using pneumatic tires.

There are other reasons for thinking that asphalt itself yields little if at all to abrasion, but only to distortion resulting from thrust. An investigation would be interesting of the effectiveness of maintaining a thin coat of asphalt on spots especially subject to abrasion by traffic, and the economy of such maintenance as compared to occasional renewal of the pavement made necessary by such abrasion.

Allied Architects Association of Los Angeles

In an article in our November issue entitled "Santa Barbara Waterworks and the Earthquake," we quoted from a bulletin which we said had been issued by the Allied Architects' Association of Santa Barbara. We have received a letter from S. P. Trood, director of publicity of the association, in which he says: "Santa Barbara has no Allied Architects' Association but the leading architects of Santa Barbara are members of the Allied Architects' Association of *Los Angeles.* This latter Association numbers among its members leading architects in different parts of Southern California. Its name is Allied Architects' Association of Los Angeles and its headquarters are in this city."

We are very glad to make this correction. The bulletin stated only that it was issued by the "Allied Architects' Association" and we assumed that it was located at Santa Barbara, since the bulletin referred to effects in that city only.

Wisconsin Penetration Road Construction

State Highway Federal Aid Improvement on State Trunk Line No. 29. Concrete Culverts and Flumes

By F. H. A. Nye

The City of La Crosse, and La Crosse county, Wisconsin, are receiving a continually increasing amount of tourist travel and auto and truck traffic which is calling for the very best in highway improvement. Especial attention is now being paid by the State Highway Commission to State Trunk Line No. 29, which has its western terminal at La Crosse and, extending eastward through some of the most interesting scenery in Wisconsin, connects with all of the trunk lines leading to the large cities of the East, and also connects at La Crosse with the principal trunk lines leading to the Twin Cities, and with lines of travel leading westward toward Yellowstone Park and the Coast.

The distance of about thirty miles between La Crosse, in La Crosse county, and Sparta, in Monroe county, is complete and available for travel except for a distance of about 4.05 miles, which stretch had been improved with a tar-bound macadam roadway nine feet wide but has been found inadequate for the continuous travel that has been passing over it.

A contract for the improvement of this piece of highway, which is being constructed with Federal aid, was entered into July 1st of this year and operations are now under full headway, under supervision of engineers of the State Highway Commission.

La Crosse county has a force of highway construction employes which it considers very competent and wished to do the work with this force, but State and Federal officials, believeing that a much better result would be obtained by placing the work under contract, let the work to A. F. Rasmussen.

The contract includes the straightening of several curves. One job of curve straightening calls for the use of more than 20,000 cubic yards of borrowed dirt, while at another place the removal of a point of sand stone will involve the blasting of about 1,600 cubic yards, which will be used in construction.

A uniform width of sixty feet is secured for the right of way, but so many electric and telephone poles have been allowed here that a large share of the grading is being done with teams and small scrapers; but wherever any considerable cut is made a gasoline shovel is used, and the dirt, if moved to any distance, is loaded into dump wagons. A Koehring gasoline shovel used on this work has a capacity of one thousand cubic yards in ten hours, using from twenty to twenty-two gallons of gasoline. All existing tar-bound surface is rooted up and removed.

READY FOR THE FIRST COAT OF ASPHALT.

About fifteen culverts are needed along the route. One of these, built in connection with the largest job of curve straightening, is 126 feet long and has an opening 6 x 6 ft. All of these culverts are reinforced with steel and careful attention given to the smoothness of the concrete on the outside so as to avoid damage from freezing soil.

In one rather steep grade there are a number of points where the water from the field runs onto the side of the highway and is apt to wash out the loose soil. As a protection against any washing there has been constructed a box flume about 560 feet long with a 3 ft. by 2 ft. cross-section.

Where there are any water runs, these will be connected with the flume by pipes, and flume and pipes will be covered with several feet of soil.

Concrete is used also for 250 lineal feet of intercepting gutter and several smaller culverts and gutters. The cement mixer used in this work is a one-bag Koehring mixer provided with rubber tires which do away with much of the jar while being moved from one job to another behind a swiftly moving truck. The sand and gravel are dumped into the skip from wheel barrows. The cement is brought from Davenport, Iowa, and the sand and gravel from Janesville, Wis., and Winona, Minn., each locality furnishing gravel suitable for some particular part of the work.

The contract includes 44,415 square yards of

PART OF 500-FOOT BOX FLUME UNDER CONSTRUCTION.

CULVERT 126 FEET LONG.

surface. After the sub grade has been established it is thoroughly rolled with a roller weighing 8,500 pounds. Six inches of crushed limestone having 3 inches maximum diameter is then spread and rolled, when a thin coat of fine crushed limestone is spread over it and the pavement again thoroughly rolled. The next application is a 2½-inch layer of lime rock of medium size, which is rolled until it presents a uniform surface, when it is ready for the first coat of asphalt. The larger portion of the first course of lime rock is obtained from local quarries, of which there are several at different points in the county; the rock for the surface course is shipped in from Lannon, Wis., a point about twenty miles from Milwaukee. The rock is all hauled in International self-dumping gasoline trucks having a capacity of about 3½ yards, which travel at a rate of about twenty-five miles per hour. A Koehring gasoline shovel, which is used also for handling dirt in excavations, is fitted with a clam shell attachment for handling stone in unloading cars, its capacity at this kind of work being eight car loads of crushed limestone in ten hours.

The quantity of asphalt used is specified to be not less than 1¾ gallons per square yard and not more than 2 gallons; the temperature is from 250° to 300°—much higher than that required for the tar which has heretofore been used in this part of the state. Stanolind paving asphalt is furnished by the Standard Oil Company of Indiana. It is heated in the railway tank car before being pumped into the distributing tank, which has a capacity of nine hundred gallons and is mounted on a General Motors chassis.

Wages paid the men vary from $3.00 to $5.00 per day of ten hours. No comparison of cost of this highway with others built in La Crosse county can be made with justice to the former. A stretch of highway adjoining this was built under contract at a cost of $34,038 per mile in 1921 which had less concrete work and less fill and cut. Work done under county supervision has cost well under $20,000 per mile, but this was with a tar binder and less attention was given to grading to a full 66 feet in width. This 4.05 miles wlil cost about $93,900 with an added $10,000 for changes made at the request of the State management, which will bring the cost of building to practically $26,000 per mile.

Paving in Birmingham

The city of Birmingham, Alabama, during the fiscal year ending September 30, 1925, did more paving work than any previous year, more than 38 miles of new pavement having been laid. About 3 miles of this was sheet asphalt, 16½ miles asphaltic concrete, 5.2 miles concrete, 7.8 miles bitulithic and 5.9 miles brick. The number of miles of each type was greater by from 50 to 100 percent than had been laid during the previous year. Between 50 and 60 projects were under way at all times during the fiscal year; as fast as one project was finished another was started. City Engineer A. J. Hawkins recommends that next year an even more extensive program be carried out, including a city-wide system of traffic boulevards.

In addition to hard pavement, there was constructed a considerable amount of slag and chert surfacing as well as grading; also sidewalks, gutters, curbs, and sewers; 25.5 miles of the last being constructed at a cost of $276,269. The total amount spent on these improvements was $2,515,874.

Gas Hazards in Street Manholes

Conditions under which hazards exist, methods of minimizing them, and materials and appliances used for that purpose.

Under the above title the Bureau of Mines has issued a report of an investigation conducted by S. H. Katz, associate physical chemist, and E. G. Meiter and J. J. Broomfield, assistant chemists of the Bureau. The authors call attention to the accidents that have occurred in a number of streets due to the presence of gas in manholes of sewers and wire conduits, give results of analyses of the air found in a number of manholes that were suspected to be dangerously polluted and suggest methods of avoiding accidents to workmen and others entering such manholes. Reference was made to explosions due to gas in manholes, but special attention is paid to avoiding the poisoning or suffocation of human beings.

Tests were made of fifteen manholes at Pittsburgh, Pa., and twelve at Philadelphia, which were suspected of being gaseous. Tests were made for carbon monoxide with palladium chloride test papers, which changed from yellow to gray or black when moistened and exposed to 0.25 per cent or more of carbon monoxide for five minutes. The test shows the presence of very dangerous amounts of that gas, such as will quickly overcome a man, but it is not sensitive enough to indicate lesser amounts which will affect a man more slowly. A better indicator for carbon monoxide in concentrations which may affect men is the iodine pentoxide or hoolamite indicator which changes from light gray to bluish gray when 0.07 per cent or more of the gas is present.

Tests for explosive gas mixtures were made at the manholes with a gas bomb, the explosion being indicated by a kick on a pressure gauge attached to the bomb. Explosive gas mixtures were found in one hole at Pittsburg and in two at Philadelphia.

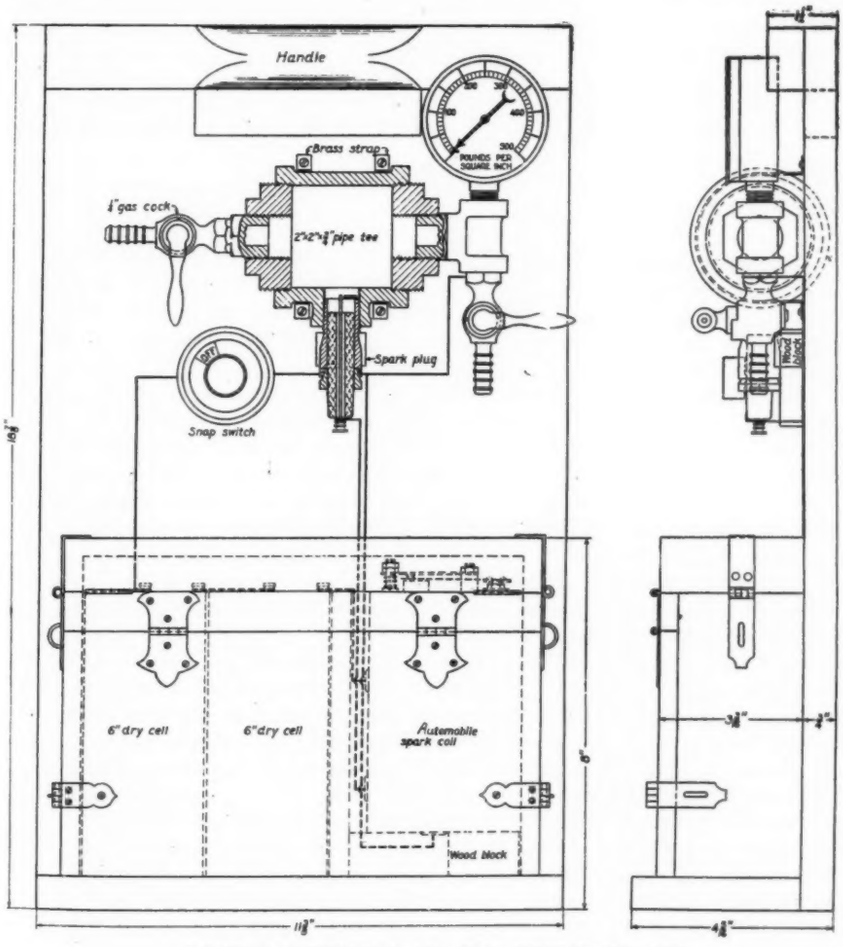
Gaseous manholes require thorough and continuous ventilation to insure safety to workers. A hand-operated rotary blower similar to a forge blower with canvas pipe leading to the bottom of the hole is serviceable. For extreme cases a hose mask is recommended in preference to an ordinary gas mask.

A tentative rule is quoted from the National Electrical Safety code as follows: "Do not enter manholes until you have assured yourself that the manholes are free from dangerous gases by testing with an approved safety lamp, by ventilation or by other adequate methods." The miners' flame safety lamps are not suitable for testing manholes because hydrogen gas may be formed therein and these lamps can initiate explosions where hydrogen or acetylene gas is present. Instead, the committee suggested the two methods referred to above.

In making the palladium chloride test, a test paper is attached to a string, moistened at one end with saliva and lowered into a hole through a perforation in the cover. After exposure for five minutes, the paper changes to gray or black if carbon monoxide is present, becoming black if the amount exceeds one per cent but only light gray if it is about 0.2 per cent. Further experiments indicated that these test papers are not reliable for concentrations of less than 0.25 per cent, although considerably less than this amount of gas is dangerous. These papers may be purchased in booklets of twenty strips, ¾ inch wide by 3 inches long, or may be made by dipping an absorbent white paper in a 10 per cent palladium chloride solution and drying. These papers are blackened by hydrogen sulphide gas as well as by CO. As the former gas is even more dangerous than the latter, any blackening of the paper in the manhole indicates danger.

The hoolamite indicator consists of a rubber hand bulb and metal tube attachments, with which air from the manhole is aspirated through activated charcoal to remove interfering gases. (Air, carbon monoxide, hydrogen and methane pass through the charcoal). The gas is then discharged through a small glass tube of hoolamite, which consists of pumice stone granules impregnated with iodine pentoxide and fuming sulphuric acid. Ten squeezes of the bulb cause the hoolamite to change from the original light gray to a greenish blue if carbon monoxide is present in 0.1 per cent or more. Comparison with a color scale which accompanies the instrument enables the investigator to estimate the concentration of CO. These tests are completed in less than a minute and are entirely safe as a danger indicator. Care must be taken, however, to change the charcoal after about 100 tests, as it becomes saturated with vapors or gases which cause changes of the color of the hoolamite when no carbon monoxide is present.

In testing for explosiveness of the air in a manhole, a bomb was used which can be constructed easily, using a 2 x 2 x ¾ inch pipe tee, standard pipe fittings, a strong pressure gauge (one with 500-pound range made for oxy-acetylene gas burners was used), and an automobile spark plug, two 6-inch dry cells, a switch, and an automobile spark coil. Gas samples are drawn from the manhole into the bomb by means of a rubber hand bulb attached between the bomb and a ¼ inch rubber tube 12 feet long. The bulb is first given 50 squeezes in order to purge the bomb thoroughly of preceding gas. The cocks are then closed and the electric switch turned. If explosive gas is present it is indicated by a kick of about 50 pounds on the gauge. Should vapors such as gasoline or benzene, which are readily absorbed by rubber, be present, flexible metal tubing or metal pipe should be used to conduct the sample to the bomb and the rubber bulb aspirator must then be used as an exhauster on the opposite side of the bomb.



BOMB FOR TESTING AIR FOR EXPLOSIVE GAS.

The dangerous gases found in street manholes in dif-

ferent cities may be grouped in three classes, (1) poisonous, (2) suffocating and (3), explosive, some falling in more than one class. These gases and their principal sources are listed in the report as follows:

Dangerous gases found in Manholes, and their Principal Sources.

Poisonous gases:	
Ammonia	Refrigerating plants
Benzol	Motor vehicles, storage tanks
Carbon monoxide	Manufactured fuel gas, flue gas, products of combustion, exhaust gases from motors
Gasoline	Motor vehicles, storage tanks
Hydrogen sulphide	Sewer gas, coal gas
Sulphur dioxide	Burning insulation
Suffocating gases:	
Carbon dioxide	Products of combustion, sewer gas
Nitrogen	"
Natural gas	Natural gas mains
Explosive gases:	
Benzol	(See above)
Carbon monoxide	(See above)
Ethane	Natural gas, manufactured fuel gas
Gasoline	(See above)
Hydrogen	Artificial fuel gases, electrolysis of water
Methane	Natural gas, manufactured gas, sewer gas
Unsaturated hydrocarbons.	Manufactured fuel gases

Most of the respiratory hazards or explosion hazards arise from the entrance of street gas, either natural or manufactured, which may leak from distributing mains. Natural gas has no poisonous constituents and respiratory hazards are comparatively few in cities supplied with this gas. In cities using manufactured gas, however, carbon monoxide may be present. Other poisonous gases which may enter manholes include ammonia, sulphur dioxide, hydrogen sulphide, benzol and gasoline. The first two are pungent and irritating, the third has a repulsive smell and the last two are readily recognized by their odor.

Carbon dioxide, nitrogen and natural gas are nonpoisonous and are dangerous only when present in sufficient amount to dilute the oxygen below 12 or 13 per cent, when the air becomes suffocating.

Of these gases, carbon monoxide is the most dangerous because its presence is not noticed except by the serious effects on those breathing it. The concentration of 0.5 per cent or more in air will in a few minutes cause unconsciousness, even without preliminary warning. In lower concentrations, headache, nausea, or a noticeable feeling of weakness may develop before loss of consciousness. 0.04 per cent is the maximum concentration that may be breathed for one hour without ill effect. Such gas may collect in unventilated manholes, but thorough and continuous ventilation will dilute the CO below a concentration that will affect a man.

Explosion may result from ignition of a mixture of gas and air in certain proportions, explosion not occurring above or below certain more or less fixed limits. It was found that Pittsburgh natural gas may explode when mixed with air in proportions between 5 and 12 per cent, mixtures of more than 12 per cent burning like gas from a burner. The manufactured gas used in Philadelphia had explosive limits ranging from 7 to 21 per cent.

Where there is free communication with the outside air, as through ventilation holes in the cover, the manhole seldom is found to contain sufficient gas to be dangerous, the gas being removed through the opening by a breathing action due to changes in barometric pressure which are continually occurring, and by convection currents. Ventilation is also aided by wind blowing across the perforations of the cover and from manhole to manhole through the conduits. Ventilation holes may become stopped by dirt, or snow or ice.

Where it is necessary for men to enter a manhole or a sewer, although poisoned gas is known to be present there, some respiratory protection should be furnished. The ordinary gas mask is not sufficient for extreme cases as it does not supply oxygen and can be considered only as a filter for removing small amounts of poisonous gas from air which is otherwise good to breathe. The most satisfactory device is the hose mask. A non-collapsible hose is fastened to a face piece and extends to fresh air. The hose is fastened to a belt or harness on the wearer and a flexible tube connects the face piece and the hose so that the head has no restraint. A person may inhale through 50 to 100 feet of ¾-inch hose without becoming tired, but if the length is greater the air must be forced to the wearer. It is important that the fresh air end of the hose be secured to some fixed object outside the manhole to prevent its falling into the hole.

Gravel Roads in Missouri and New Mexico

Descriptions by engineers of methods of constructing and maintaining them under widely varying climatic conditions.

Two recent articles by engineers dealing with constructing and maintaining gravel roads, show what great variations in practice must be made to provide for differences in climate; and incidentally, under what widely varying conditions a gravel road can be made to give satisfaction.

IN MISSOURI

B. H. Piepmeier, chief engineer of the Missouri state highway department, in an excellent article on gravel road maintenance, states that "the success of gravel road maintenance depends more on proper drainage and dragging than on the amount of materials used.—The drainage provided must be carefully maintained.—Side ditches must be frequently cleaned and kept open and straight.—Excess material removed from ditches should not be deposited upon, nor in such a manner that it will get upon, the gravel portion of the roadway.—For the convenience of traffic and ease in maintaining the gravel surface, the center of the gravel road should not be over four or five inches above the edges or shoulders of a road 24 to 28 feet in width.

"The moisture content of the gravel is an important factor in the work of keeping the surface smooth. This fact is shown by the ready formation of ruts and holes after heavy rain, and the tendency of the surface to ravel in dry weather. The dry weather condition is probably the most serious, as it is usually coincident with the heaviest traffic of the season. To keep the gravel surface smooth, a thin, loose layer of fine gravel must be kept moving by the use of a drag, blade grader, or both. Dragging the road after a heavy rain and then leaving it until the next rain is of little benefit to a road carrying a large volume of traffic. The longer and more severe the dry spell, the more the surface ravels and the more consistent must be the maintenance. Fine material, which is whipped from the surface by speeding traffic, must be brought back by means of a drag or a blade, as rapidly as it is displaced.

"The old idea that repair gravel should be mixed with binder in order to make it pack readily is erroneous. Clean gravel will pack without hindrance to traffic, if properly applied and maintained.—Excess binder in gravel roads is a cause of dust in dry weather, mud in wet weather, impassable roads in winter weather and trouble for the maintenance man the year round.

"Gravel should be applied in thin layers only.—Where it is necessary to increase the thickness of a gravel surface, the operation should be done by applying thin layers of not over two inches in thickness at each application. After the first layer has been well worked in under the action of a drag and thoroughly compacted, the second layer may be applied in the same manner. In applying the surface dressing material, however, never apply it in layers over one inch thick."

Earth should never be dragged onto a gravel road from the shoulders, and if any is carried on by vehicles, fine, clean gravel should be spread to take up the excess binder.

"Gravel roads should be shaped up each spring.—The proper contour of the cross-section can be preserved by reversing the drag; first dragging from the center out, and then from the outer edge toward the center. Furthermore, it is not good practice to continually drag in the same direction. The direction in which the drag travels should be alternated."

A gravel road properly built and maintained should never require scarifying. It may be necessary, however, to scarify a gravel road in order to reconstruct it and remove oversize material. The material loosened by the scarifying is placed into a windrow in the center of the road and the oversize gravel is forked and raked out. It is often possible to clear the surface of stones by means of a blade grader, starting on one shoulder and drifting the loose stone across to the opposite shoulder; the heel of the blade being carried about 1½ inches above the surface to permit the fine material to feather out under the blade.

Where traffic is heavy, considerable dust may result from the wearing of the gravel, and it has been found advisable in some cases to apply asphalt and tars to prevent dust, and save the cost of replacing large quantities of gravel worn from the surface.

IN NEW MEXICO

Speaking for New Mexico's conditions, O. C. Payne, project engineer of the New Mexico highway department, prefaces a brief article on gravel roads by stating that the southwestern part of the state is noted for long periods of drought and presents serious difficulties to the road builder. The gravel available in this district is a hard, durable washed stone, very seldom containing any clay material but usually only a clear beach sand. Screening leaves the gravel very well graded, but with absolutely no cementing quality, and when placed in a trench on the subgrade, it presents the appearance of a bathing beach.

After placing the first course of gravel 4 inches deep and 16 feet wide, the surface is bladed, and 1½ to 2 inches of binder material, which consists of a mixture of very fine gravel, sand, adobe and clay, hauled in with trucks, is spread over the full width of the surface. The binder is then thoroughly harrowed into the surface, giving the appearance of a dirt road. The road is then thrown open to such traffic as has the courage to venture upon it. As the traffic makes a rut, the blade is used to fill this up and a new track is broken and this is repeated until at last all parts of the surface have been compacted. This first course is then bladed and rolled, and a second layer of gravel with its topping of binder is added and treated like the first. One month usually suffices to obtain enough compacting of the base course to allow placing of the second, and often a hard, durable, smooth riding highway with both courses in place is obtained in as short a period as six weeks.

A road so built was opened by the depatment with a bar some time after construction in order to take samples of the material used, and it was necessary to use a 12-pound bar to break through the base course after a hole had been made in the top course with a trench shovel. Both courses appeared to be cemented for the full depth and showed a state of compaction that was considered highly gratifying in view of the entire absence of water during construction.

Jacksonville Water Supply

Jacksonville, Florida, expects to spend ten and one-half million dollars in the development of a new water supply, and already began, late in October, the construction of a six-million-gallon reservoir at the Riverside sub-station to cost $245,000 and to be completed within 250 working days from the date of contract. This reservoir and two wells are designed to meet the immediate needs of the city, but will also form important items in the new system.

At present, the supply is hard water which is softened before being distributed, but the new supply will be soft water derived from the watershed of Black creek. Considerable new pumping equipment and pipe line will be necessary to bring this water to the city, but once there, practically all of the present equipment will be utilized in storing and distributing it.

The rapid growth of Jacksonville during the past few years has necessitated bringing the daily capacity up to twenty million gallons by the summer of 1926.

The supply available from Black creek is believed by the engineers to be sufficient for any future growth of the city which can reasonably be anticipated. The cost of the new reservoir and the two wells which will meet present demands, will be defrayed by a bond issue for a half million dollars, which has already been sold. In order to meet the cost of developing the new source of supply, the city will ask the Florida legislature to authorize, this winter, a new bond issue of eleven million dollars.

Disposal Plant Records

Information required from operators of sewage disposal plants by the Kansas State Board of Health.

The state laws of Kansas require that operators of sewage disposal plants in that state make monthly reports on the operation of the plant to the State Board of Health, sworn to before a notary public. For this purpose the board furnishes blanks providing for entering daily records, on the back of which are instructions for making the tests required and explanations of what information to furnish. Each column for the daily record and each line for the general record is numbered, the numbers running from 1 to 37. These are as follows: 1—Stream condition (whether in flood, low, frozen, etc.). 2—Pumpage or flow (based on pump counter, weir readings, dosing tank counter, or other method made possible by the nature of the plant). 3—Temperature of air at plant. 4—Temperature of sewage at plant. 5—Number of tanks in use.

Tanks. 6—Condition of contents (whether foaming, no action, considerable action, etc.). 7—Depth of scum in gas vent (measure at different points and record the average). 8—Depth of scum in sedimentation chamber (give average). 9—Average depth of sludge (take samples at different depths by means of a sludge sampler and record average depth). 10, 11, 12 and 13—Settling solids at inlet, 1 hr. and 2 hrs., and at outlet, 1 hr. and 2 hrs. (Take sample of sewage entering tank and another after the sewage has passed through the tank, and make the test for settling solids 1 hr. and 2 hrs. later). (From 6 to 13 apply to Imhoff tanks. The same are repeated for Septic tanks in columns 14 to 20, omitting depth of scum in gas vent.)

Contact Beds and Sprinkling Filters. 21— Period of contact (for a contact bed, the time after the filling of the bed is completed until the bed starts to discharge; for a sprinkling filter, the time of spraying). 22—Period of rest (time between doses of sewage when the bed is standing idle). 23 and 24—Settling solids at outlet 1 hr. and 2 hrs. (samples after passing through contact bed or sprinkling filter tested as above). 25—Stability dilution. 26—Stability figure (test for stability samples taken as for 23 and 24).

Filters. 27 to 30—Turned on, off, cultivated, cleaned (one column provided for each of four filters. Whenever a filter is turned off, on, cultivated, scraped or cleaned, the fact should be recorded in the column for that filter). 31 and 32—Stability dilution and figure (for samples collected after sewage has passed through filter).

General. 33—Date of last scum treatment and nature of treatment. 34—Date of last removal of sludge from tank. 35—Depth of wet sludge on sludge bed. 36—Depth of same sludge when dry. 37—Date of last removal of dry sludge from bed.

The following instruction for making tests are given:

Samples of raw sewage and of the effluents of the various tanks, beds, etc., should be taken at least twice weekly, and tests for relative stability and settling solids run on these.

RELATIVE STABILITY

Fill a 4-oz bottle to overflowing, add 1 c.c. Methylene blue solution. Insert stopper and let stand at room temperature till the blue has faded out. Note the number of days to change the color, and record the stability figure.

A sewage may be called stable when the contained organic matter has taken such a form that it is not capable of undergoing offensive putrefaction.

Relative stability is the ratio of the available oxygen in the sample to the amount required to render it stable.

A stability figure of 75 means that the sample contains 75% of the oxygen necessary for stability.

The accompanying table gives the stability figures for different periods.

For effluents of extremely low stability dilutions should be made in aerated water and the relative stability of the mixture noted. A few trials will be necessary before the proper dilution may be determined.

Time Required to Decolorize Methylene Blue at Room Temperature. Days	Stability Figure	Time Required to Decolorize Methylene Blue at Room Temperature. Days	Stability Figure
0.5	11	8.0	84
1.0	21	9.0	87
1.5	30	10.0	90
2.0	37	11.0	92
2.5	44	12.0	94
3.0	50	13.0	95
4.0	60	14.0	96
5.0	68	16.0	97
6.0	75	18.0	98
7.0	80	20.0	99

SETTLING SOLIDS

Place 1,000 c.c. of sample in settling glass and allow it to remain quiet. Record c.c. of sediment in bottom of glass at the end of 1 hour, 2 hours, from time of filling the glass.

This test approximates the action in a settling tank, and a comparison of the effluent of a tank with a sample that has had a settling period in a glass of equal length to the detention period in the tank gives a good check on the operation of the tank.

Removing Ice from Waltham's Streets

In his report for last year George C. Brehm, director of public works of Waltham, Mass., describes as follows the method that city employed for removing ice from its roadways:

Following one of the storms of the first week of February we had about six inches of snow, which turned to rain and then froze. This left some of the roads in a very rutty condition and made them almost impassable.

To protect the roads and make it possible for traffic to move more readily, it was decided to use a road roller to break up the ice ruts. The cleats

on the rear wheels are 3 inch angle-irons and, to keep the roller from sliding, 2½-inch T-irons were bent around the front wheels. The results were more than had been expected. Following this, a Baker snow-plow was used to push the cakes of ice broken by the roller.

Paving in Imperial County

The section of the old Spanish trail which crosses the sand hills in Imperial County is to be paved with a more permanent surface than the present road of movable timber, which is deteriorating rapidly. Bids have been asked, and will be opened on December 21st, for paving a six-mile stretch of this section with either concrete or bituminous macadam, alternate bids being asked for these two types of pavement. Decision as to which kind of pavement will be used will be made after the bids have been opened.

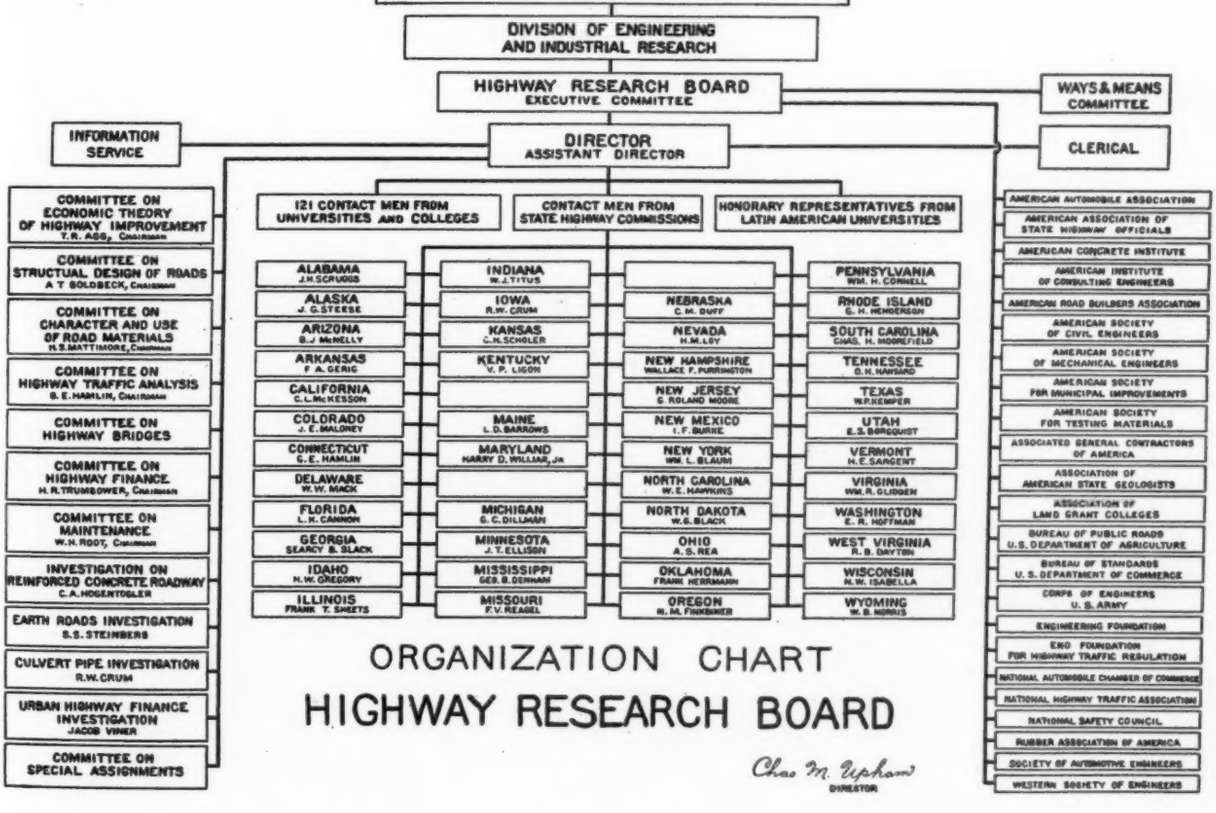
The water hazard connected with pavement construction in this section was removed recently by the California highway commission by drilling a well 153 feet deep in this area, which gives a flow of water suitable for paving operations and which contractors can use for this purpose.

Highway Research Board Meeting

Results of the year's investigations of economics, structural design, materials, traffic, finance, maintenance, low cost roads, culverts, and steel reinforcement in concrete roads.

The annual meetings of the Highway Research Board, the fifth of which was held on December 3rd to 4th, have taken an important position among the various conventions and other assemblies of highway men in the country. The work of this board is, as its name indicates, confined to research into the scientific principles underlying highway construction and maintenance and is concerned only indirectly with engineering and financial problems.

The research may be generally classed under two heads: First, investigation of existing roads and road appurtenances to determine the technical reasons for success or failure with a view to deducing the reasons therefor, and using this information to formulate methods of securing the best results under any given conditions; and second is laboratory research in which combinations are made of known materials and conditions, and the results obtained are determined by tests more or less closely simulating actual service conditions.


NATIONAL ACADEMY OF SCIENCES
NATIONAL RESEARCH COUNCIL
DIVISION OF ENGINEERING AND INDUSTRIAL RESEARCH
HIGHWAY RESEARCH BOARD
EXECUTIVE COMMITTEE
WAYS & MEANS COMMITTEE
INFORMATION SERVICE
DIRECTOR
ASSISTANT DIRECTOR
CLERICAL
COMMITTEE ON ECONOMIC THEORY OF HIGHWAY IMPROVEMENT T. R. AGG, Chairman
COMMITTEE ON STRUCTURAL DESIGN OF ROADS A. T. GOLDBECK, Chairman
COMMITTEE ON CHARACTER AND USE OF ROAD MATERIALS H. S. MATTIMORE, Chairman
COMMITTEE ON HIGHWAY TRAFFIC ANALYSIS E. E. HAMLIN, Chairman
COMMITTEE ON HIGHWAY BRIDGES
COMMITTEE ON HIGHWAY FINANCE H. R. TRUMBOWER, Chairman
COMMITTEE ON MAINTENANCE W. H. ROOT, Chairman
INVESTIGATION ON REINFORCED CONCRETE ROADWAY C. A. HOGENTOGLER
EARTH ROADS INVESTIGATION S. S. STEINBERG
CULVERT PIPE INVESTIGATION R. W. CRUM
URBAN HIGHWAY FINANCE INVESTIGATION JACOB VINER
COMMITTEE ON SPECIAL ASSIGNMENTS
121 CONTACT MEN FROM UNIVERSITIES AND COLLEGES
CONTACT MEN FROM STATE HIGHWAY COMMISSIONS
HONORARY REPRESENTATIVES FROM LATIN AMERICAN UNIVERSITIES
ALABAMA J. M. SCRUGGS
ALASKA J. G. STEESE
ARIZONA B. J. McNELLY
ARKANSAS F. A. GERIC
CALIFORNIA C. L. McKESSON
COLORADO J. E. MALONEY
CONNECTICUT G. E. HAMLIN
DELAWARE W. W. MACK
FLORIDA L. H. CANNON
GEORGIA SEARCY B. SLACK
IDAHO H. W. GREGORY
ILLINOIS FRANK T. SHEETS
INDIANA W. J. TITUS
IOWA R. W. CRUM
KANSAS C. H. SCHOLER
KENTUCKY V. P. LIGON
MAINE L. D. BARROWS
MARYLAND HARRY D. WILLIAMS, JR.
MICHIGAN G. C. DILLMAN
MINNESOTA J. T. ELLISON
MISSISSIPPI GEO. B. DENHAM
MISSOURI F. V. REAGEL
NEBRASKA C. M. DUFF
NEVADA H. M. LOY
NEW HAMPSHIRE WALLACE F. PURRINGTON
NEW JERSEY C. ROLAND MOORE
NEW MEXICO I. F. BURKE
NEW YORK WM. L. BLAUM
NORTH CAROLINA W. E. HAWKINS
NORTH DAKOTA W. E. BLACK
OHIO A. D. REA
OKLAHOMA FRANK HERRMANN
OREGON H. M. FINKBINER
PENNSYLVANIA WM. H. CONNELL
RHODE ISLAND G. H. HENDERSON
SOUTH CAROLINA CHAS. H. MOORE FIELD
TENNESSEE O. H. HAYNARD
TEXAS W. P. KEMPER
UTAH E. S. BORGQUIST
VERMONT H. E. SARGENT
VIRGINIA WM. R. GLIDDEN
WASHINGTON E. R. HOFFMAN
WEST VIRGINIA R. B. DAYTON
WISCONSIN H. W. ISABELLA
WYOMING W. B. MORRIS
AMERICAN AUTOMOBILE ASSOCIATION
AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS
AMERICAN CONCRETE INSTITUTE
AMERICAN INSTITUTE OF CONSULTING ENGINEERS
AMERICAN ROAD BUILDERS ASSOCIATION
AMERICAN SOCIETY OF CIVIL ENGINEERS
AMERICAN SOCIETY OF MECHANICAL ENGINEERS
AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS
AMERICAN SOCIETY FOR TESTING MATERIALS
ASSOCIATED GENERAL CONTRACTORS OF AMERICA
ASSOCIATION OF AMERICAN STATE GEOLOGISTS
ASSOCIATION OF LAND GRANT COLLEGES
BUREAU OF PUBLIC ROADS U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF STANDARDS U. S. DEPARTMENT OF COMMERCE
CORPS OF ENGINEERS U. S. ARMY
ENGINEERING FOUNDATION
ENO FOUNDATION FOR HIGHWAY TRAFFIC REGULATION
NATIONAL AUTOMOBILE CHAMBER OF COMMERCE
NATIONAL HIGHWAY TRAFFIC ASSOCIATION
NATIONAL SAFETY COUNCIL
RUBBER ASSOCIATION OF AMERICA
SOCIETY OF AUTOMOTIVE ENGINEERS
WESTERN SOCIETY OF ENGINEERS
ORGANIZATION CHART
HIGHWAY RESEARCH BOARD
Chas M. Upham
DIRECTOR

This year's meeting, like the previous ones, was held at the National Academy of Sciences and National Research Council Building. The attendance at the meetings averaged about three hundred, while the total registration undoubtedly exceeded this. Four sessions were held, two each day, and in addition a dinner on Thursday evening at which addresses were given by several prominent speakers. The four sessions were presided over by A. N. Johnson, W. J. Brosseau, E. J. Mehren and W. K. Hatt.

Meetings were devoted to the reading and discussion of reports from the several committees, the subjects being as follows: "Economic Theory of Highway Improvement," chairman, T. R. Agg; "Structural Design of Roads," chairman, A. T. Goldbeck; "Character and Use of Road Materials," chairman, H. S. Mattimore; "Highway Traffic Analysis," chairman, G. E. Hamlin; "Highway Finance," chairman, H. R. Trumbower; "Maintenance," chairman, W. H. Root; and "Development of Earth Roads," chairman, S. S. Steinberg.

In addition, reports were submitted of investigations that had been made by the Board for industrial concerns and others, these investigations being on "Urban Aspects of Highway Finance Problems," the investigation being made by Jacob Viner; "Investigation of Culverts" made by R. W. Crum; and "Economic Value of Steel Reinforcement in Concrete Roads," investigated by C. A. Hogentogler. The last was the most extensive of the investigations and the one that received the most discussion at the meeting. Summaries of the several reports are given below, together with some of the points brought out in the discussion.

COMMITTEE ON ECONOMIC THEORY OF HIGHWAY IMPROVEMENT

Chairman, T. R. Agg, *Iowa State College*

Relation of tire tread wear to type and condition of road surface.—The investigations on this subject show the following preliminary results:

TIRE WEAR INDICES FOR VARIOUS ROAD SURFACES

Road Surface	*Index Number*
P. C. concrete	1.00
Monolithic brick	1.01
Bituminous filled brick	1.00
Iowa gravel	2.20
Chert gravel	7.30
Bituminous macadam without seal coat	10.60

Other investigations show that the rate of tire wear on macadam is 17 times as great as on concrete, and may be 56 times as great on poor macadam.

Intensity of downward kick of rear wheels of vehicles starting from rest.—Theoretical analysis and experiments with twelve vehicles tend to show that the intensity of the downward kick ranges from 100 pounds to as much as 1,000 pounds.

Wind resistance of motor vehicles.—The intensity of wind resistance, determined by wind-tunnel measurements, appears to follow closely the law: $R_w = .0025AV^2$; where R_w is the total wind resistance in pounds; A the projected cross section area of the vehicle in square feet; and V the velocity in miles per hour of the air with respect to the vehicle.

Relative wear and tear upon highways produced by light and heavy trucks.—The complete report presents data covering a wide variety of vehicles operated under diverse conditions.

Tractive resistance.—Experiments show that the sum of rolling plus air resistance is correctly expressed as: $R_t = R_r + R_w$; where R_t is the sum of rolling plus air resistance; R_r the rolling resistance for the particular type of tire and road; and R_w the air resistance.

A large number of determinations of values for R_r show that it varies from 20 to 30 pounds per ton for good surfaces, and may be as high as 100 pounds per ton on inferior surfaces.

Riding qualities of road surfaces, rolling resistance and gasoline consumption on typical highways are being studied, but these projects are not in the stage where results are available.

COMMITTEE ON STRUCTURAL DESIGN OF ROADS

Chairman, A. T. Goldbeck, *formerly with U. S. Bureau of Public Roads*

Subgrade investigations.—The most unfavorable subgrade conditions are due to excess moisture in soils that are affected thereby. Such excess moisture results from (*a*) poor surface drainage, and (*b*) poor internal drainage.

Under the most favorable climatic conditions few failures are due to the subgrade. Favorable climates involve moderate temperatures with comparatively low precipitation, and particularly low precipitation during the winter months. Unfavorable climates have long continued periods of cold weather; high precipitation during freezing weather; or frequent alternations of freezing and thawing combined with deep freezing.

Additional information on admixtures for subgrades is included in the report.

Stresses in concrete road slabs.—Tests indicate that concrete, when reinforced with small amounts of steel, may be extended more without visible cracking than when unreinforced.

The extensibility of dry concrete beams was found to be less than that of wet specimens.

Deformation measurements in existing concrete roads furnish an excellent index of the load-carrying ability of the slab. The recent measurements corroborate the thickened edge design. Tests in Cook County, Illinois, indicate that a 9-7-9 section is suitable for an 8,750-pound maximum wheel load.

It is indicated that, for all practical purposes, the stress produced in concrete pavements is directly proportional to the wheel load.

Within practical minimum limits of axle spacing, the individual axle loads of a six-wheel truck may be as heavy as in the case of a four-wheel truck.

Theoretical stress analysis.—Stresses in concrete pavements have been determined by the mathematical Theory of Elasticity closely approximating those determined by test measurement. Tables of stresses have been prepared from which it is possible to proportion the slab under given conditions.

The analysis shows that the "stiffness factor" of the subgrade does not greatly affect the pavement stresses.

Planes of weakness introduced in concrete roads.—Attention is called to a promising experiment in which an attempt is made to control the transverse cracking in concrete pavements. This is done by creating transverse planes of weakness in the pavement during construction.

COMMITTEE ON CHARACTER AND USE OF ROAD MATERIAL

Chairman, H. S. Mattimore, *Pennsylvania State Highway Department*

High alumina cement.—High alumina cements are reported to be resistant to acid and alkali waters. The strength of this class of cement at 24 hours is equivalent to that of Portland cement at 28 days, but its behavior in long-time tests is not definitely known.

While the cost of high alumina cement is from two to three times that of Portland cement, it has been successfully used on special construction.

Zone paints.—The conditions under which zone paints for highways are used, suggest that the following are the most important factors involved, and are the ones for which various laboratory tests are essential in selecting paint for such service:

1. Consistency (i. e., freedom from clogging tendencies when applied by the prevailing methods).

2. Spreading rate.
3. Hiding power (capacity).
4. Drying time.
5. Light resistance.
6. Visibility (both day and night).
7. Durability (resistance to weather and abrasion).

The complete report contains suggested types of apparatus for the above tests.

Accelerators in Portland cement concrete.—The various investigations reviewed in this report indicate that calcium chloride and compounds with a calcium chloride base may perform the useful function of accelerating the hardening of concrete. The rate of acceleration for the compounds commonly used is in a direct relation to the calcium chloride content.

The principal advantage of these accelerators is the securing of early high strength. This results in the earlier possible use of the structure and in protection against adverse curing conditions.

The report of the committee on structural design of roads had been sub-divided and the several subjects assigned to different members of the committee as follows: "Sub-grade Investigations," I. B. Mullis; "Sub-grades in California," C. L. McKesson; "Stresses in Concrete Road Slabs," H. M. Westergaard. "Extensibility of Concrete" was discussed by Dr. W. K. Hatt and by Prof. H. E. Breed; and "Planes of Weakness" was discussed by Mr. Somerville, while E. R. Hoffman gave some interesting figures concerning comparative strength of different sections.

The matter of high alumina and other quick hardening cements was presented by F. C. Lang; that of "Accelerators and Other Admixtures" by R. W. Crum; and the matter of "Zone or Traffic Paints," by H. S. Mattimore.

COMMITTEE ON HIGHWAY TRAFFIC ANALYSIS

Chairman, G. E. HAMLIN, *Connecticut State Highway Commission*

The three-lane two-way roadway.—A three-lane two-way roadway is one upon which the traffic movements are in both directions, and which is only wide enough for three moving vehicles to be abreast.

The actual traffic capacity of a two-lane roadway varies within wide limits. It is evident that a three-lane roadway will permit vehicles to pass each other with a greater frequency than on a two-lane road. The three-lane roadway, however, provides conditions under which accidents may frequently occur. The Committee recommends the use of a four-lane roadway when the capacity of the two-lane two-way roadway is exceeded.

Highway traffic.—Transportation surveys indicate a close relationship between population per square mile, the trend of population, growth and industrial development, and the amount of traffic using the highways.

The prediction of expected future traffic based on the projection of the trend of motor vehicle registration is a reasonably accurate measure of future highway traffic.

Elimination of obstacles impeding the free flow of traffic.—The movement of traffic over any route depends upon its ability to move freely at all points.

The Committee believes that the elimination of obstacles to traffic on many highway routes will be justified by the increase in the safe movement of traffic; and in some cases, the program of widening can be economically deferred by this method.

The Committee recommends, in the construction program for highway improvement, that there shall be seriously considered the planning for arterial highways outside the congested areas.

The Committee is of the opinion that, in many cases, the installation of a fixed signal supported by a pedestal at the intersection of highways is not justified.

Adequate rights-of-way.—The Committee recommends the following:

1. Determination of present right-of-way.
2. A highway transport survey to determine necessary required widths.
3. Acquisition of additional necessary width.
4. Simplification of method of acquisition to permit immediate occupancy.

Type of pavement based on traffic.—The type of pavement should be based on the character and volume of traffic.

J. G. McKay stated that it had been found in the several states where traffic figures were available that fifteen to twenty per cent of the vehicles were from outside the state, taking the average for the year, the number of foreign cars being about five percent more than this in summer and less in winter, while the mileage of the foreign cars would average about double that of those belonging in the state.

COMMITTEE ON HIGHWAY FINANCE

Chairman, H. R. TRUMBOWER, *U. S Bureau of Public Roads*

Urban Aspects of the Highway Finance Problem

JACOB VINER, *University of Chicago*

As this research is still under way, the findings are tentative. On many important points the absence of the necessary statistical data limits research to discovery of the problems rather than of the means to their solution.

The contribution of urban-dwellers to the financing of rural highways.—The contribution by urban automobile owners of a large fraction of the state motor vehicle tax revenues, the expenditure of these revenues upon the construction and maintenance of rural highways, and the absence of state contributions to the cost of construction and maintenance of urban streets, appears to involve an injustice to urban automobile owners. The problem, however, is not as serious as it appears, since traffic tests indicate that the bulk of the traffic on rural highways is urban traffic. Nevertheless, some participation of cities in the revenues from state motor vehicle taxes seems just.

Financing city streets.—The space occupied by city streets would be needed, even in the absence of surface transportation, for purposes of access to air and sunlight, and for city ornamentation. Some proportion of the cost of pavements is properly to be charged to street railways, horse-drawn vehicles and pedestrian traffic. The bulk of the cost is now borne by real estate. Urban motor vehicle and tax revenues provide but a negligible percentage of these costs. The case for and against a transfer of a more substantial part of this cost from real estate to motor vehicle owners is being investigated.

Financial aspects of urban traffic control problem.—The increasing financial burden on cities providing facilities for growing automobile traffic, requires coordination of traffic control policies with construction and maintenance program. Traffic congestion is an automatic but wasteful mode of traffic restriction, and it will be necessary to devise programs of restrictions in congested areas which will prevent undue congestion by restricting traffic at peak periods to economically efficient carriers. Current comparisons of efficiency in passenger transportation on basis of road-space-displacement per seated passenger are inadequate. Road-space-displacement per actual passenger-mile is a better formula. The possibility of economic control of traffic through the development of fees based on use of road space at peak periods is being considered.

COMMITTEE ON MAINTENANCE OF ROADS

Chairman, W. H. ROOT, *Iowa State Highway Commission*

Dust prevention and surface treatment of gravel and macadam roads.—Light asphaltic oils are used to a limited extent and are effective for six weeks to one season. Two or three applications of calcium chloride are effective for one season, and a cumulative effect is noted after two or three years of treatment. Bituminous mats are maintained on gravel by using both hot and cold applications. Two treatments in three years or three treatments in four years are necessary.

Crack fillers for concrete pavements.—Lack of uniformity

of specifications of various states is shown. The standard penetration of asphalt ranges from 35 to 250. Patented crack fillers have, in general, proved unsatisfactory.

Snow removal.—A complete report for the winter of 1924-25 shows that 48,000 miles of road were included in the snow removal program of 35 states. Nine states include their entire road system in the snow removal program. The cost of snow removal is greatly diminished by proper attention to drift prevention. Four requirements of organization are: (1) an efficient organization, (2) a definite program, (3) suitable and ready equipment, and (4) a plan of action that will start with the storm and continue until the roads are open.

Guide, caution and danger signs.—Uniform signs and a comprehensive nation-wide number system have been adopted by the National Committee on Signs, and are rapidly being put into effect by various states.

Standardized maintenance accounting.—Progress is shown in the use of standardized methods of accounting. Of 20 states reporting, 8 are now using the American Association standard recommendations, 3 a modification of this system, 3 favor it but are not using it, and 6 report individual systems.

Relation between age of pavement and annual maintenance costs.—Pavement age has a definite effect on maintenance costs. Maintenance records since 1888 on asphalt pavements at Columbus, Ohio, show repair costs to increase somewhat uniformly with the age of pavements. At the critical period, the tenth or thirteenth year, there is a marked increase in maintenance cost, reaching a maximum average of one cent per square yard.

The report also discusses coverings of disintegrated concrete roads, and the methods and effects of bituminous treatments of earth, sand-clay and top-soil roads.

The matter of maintenance had been divided into eight topics and one given to each of the members. In the matter of crack fillers, it was reported that some states used tar and some asphalt, and a number used mastic where the crack exceeded ¼ of an inch in width. One of the members told of a scheme introduced by a contractor of cleaning out the cracks by directing into them the exhaust from a Ford car by means of a short length of pipe.

In the matter of snow removal, H. K. Bishop reported that about $1,380,000 was spent for this purpose last winter and more will undoubtedly be spent the coming winter if the amount of snowfall demands it. The depth of snowfall in the different states varied widely, California alone reporting a snowfall between one inch as a minimum and a maximum of seven hundred inches. Equipment practice had become more or less standardized, plows on trucks being used in snow up to 12 to 15 inches depth; plows, either blade or V, on tractors up to 36 inches; and rotary plows on the deeper drifts up to 9 feet. A number of the states were using methods of snow prevention, the fence preferred being the light type rather than the heavy railroad type. Assuming for the light type of fence a life of five years, one state highway department found the cost to be about 4.9 cents per foot, this including overhead, setting up, removing, storing, etc. It was calculated that in most cases the cost of keeping the highway clear of snow was more than equaled by the saving effected in maintenance during the coming year.

The guide, caution and danger signs adopted by the National Committee on Signs have already been described in Public Works, and a letter ballot is to be taken of all states with a view to obtaining universal adoption of them.

It seemed impracticable to obtain serviceable figures representing the relation between age of pavement and maintenance cost, for the reason that pavements having any considerable age were constructed using materials and methods different from those now being employed; in addition to which the traffic which the older pavements have carried was much less than that being carried at the present time.

In connection with this report, a brief description was given of the "roughometer," which has been devised by the Bureau of Public Roads and which registers the amount of jolting or rather the motion of the front axle relative to the body of an automobile, giving the total amount of such motion in traveling at a given speed over any desired unit of distance, such as a mile, of the road in question.

COMMITTEE ON DEVELOPMENT OF EARTH ROADS

Chairman, S. S. Steinberg, *Assistant Director, Highway Research Board*

Highway engineers have long felt the need of a type of road surface that would serve for secondary or local traffic and yet be low in first cost and maintenance. Though considerable has been accomplished in the development of the higher type surfaces for use on main traffic roads, comparatively little progress has been made in the methods for improving secondary or natural soil roads, which constitute about eighty-five percent of the total road mileage in the United States. In their present unimproved condition the local roads cannot function properly as feeders to the main routes, thus depriving considerable areas and great numbers of individuals of the benefits of those portions of our highway transportation system already completed.

In view of the enormous mileage of local roads and the comparatively small amount of traffic upon them, it is evident that for many years to come it will be economically impossible to surface all these roads with the more costly types of pavements.

Realizing this fact, the state highway departments and the universities have conducted experiments for the purpose of stabilizing and protecting the surface of earth roads. These have included soil selection methods, bituminous treatments, chemical treatments and veneer-macadam.

The objects of this investigation are to coordinate the efforts and data already available on the improvement of earth roads and to stimulate further research in order to find an inexpensive road surface to carry intermediate traffic. It is recognized that no single answer to this problem would serve the entire country, but that due to differences in soil and climatic conditions the solutions will be matters affected by geography and geology. It is also felt that a proper solution may need to take into account the chemistry of the road itself, a field of research as yet untouched, but one which may help solve not only the earth road problem but also many of the subgrade difficulties encountered in the use of the more costly surfaces.

The writer's connection with this investigation has been a temporary one, and the study this far has been preliminary and chiefly for the purpose of assembling and correlating all available information of completed, current and proposed research on earth road treatments. No field inspections have yet been made, but the material assembled will enable the investigator to study effectively in the field the experiments completed or under way in many sections of the country.

Thus far the following work has been done:

1. Statistical material has been collected for determining the mileage of and expenditure on earth roads in the states.

2. Through the kindness of the Chief Bibliographer of the Library of Congress, and with the aid of the U. S. Bureau of Public Roads, a bibliography on earth roads and earth road treatments has been prepared.

3. A search has been made in the Patent Office of all

patents granted on earth road treatments of which about a hundred have been assembled.

4. Information has been gathered of research on earth roads now under way in various states and by universities.

5. Through the state contact men of the Highway Research Board information has been secured as to methods of earth road treatment now in use in the states.

6. By correspondence and conferences interest in the earth road problem has been aroused among highway engineers and researchers.

7. By radio talks and by articles in the press, the attention of the public has been called to the importance of the present investigation.

I desire to express to the state highway departments and to the universities my appreciation for their cooperation in the study thus far. Not only have they shown a readiness to supply all information they possess, but they have expressed a desire to be informed as to how they might contribute by research toward the success of this investigation. With such united effort the solution to this important problem cannot be far distant.

This report received quite general discussion. Two or three of the members spoke of the importance of bringing the findings of this committee to the attention of road superintendents and others and persuading them to adopt recommended methods. S. H. Webster told of the work done by the state highway association of Rhode Island in educating local men. Prof. Hatt, however, stated that research and university extension work were two different matters requiring different methods and different kinds of men, and that research only was the purpose of this organization. In this connection, one member stated that in view of the importance of the co-operation of the men on the job, human research might be undertaken by the research board.

Speaking for the Bureau of Public Roads, Thos. H. McDonald said that this matter of earth and other low-cost roads was recognized as being the most difficult one that had yet been tackled by the bureau. A beginning had been made along several lines, including both the chemical and physical. It had been learned that the ultra clays were what might be called the life of soil and were largely responsible for difficulty experienced in draining out capillary water. In this connection he remarked that the exact meaning of the word drainage has not yet been defined; to cover, for instance, phenomena connected with both sand and fine clay.

REPORT ON CULVERT INVESTIGATION

The report on culvert investigation was based upon examination of about 500 culverts distributed over fourteen states and including various materials, chiefly cast iron, wrought iron and steel, concrete, and vitrified clay. The report was largely one of progress and definite conclusions were not vet available from the data obtained. In discussing this paper, Prof. Marston described in some detail the conclusions drawn from experiments on the loads upon culverts and other pipes when buried at different depths and under different conditions.

REPORT ON VALUE OF STEEL REINFORCEMENT

The afternoon of the second day was devoted to the subject of Value of Steel Reinforcement in Concrete Roads. Mr. Hogentogler stated that investigation had been made of sections representing between 2,000 and 3,000 miles of roads scattered through a considerable number of the states and representing probably almost all conditions found anywhere in the country. Previous experience with similar investigations had prepared the committee to find the reports of the various classes of roads so apparently contradictory as to make it difficult to draw any conclusions. It was therefore most agreeably surprised to find that a considerable majority of the facts, when put into shape for plotting on co-ordinate paper, could be represented with fair approximation by curves and formulas. That is, there was an outstanding uniformity and correspondence which permitted the forming of a number of conclusions with a reasonable amount of confidence.

REPORT ON THE INVESTIGATION OF THE ECONOMIC VALUE OF REINFORCEMENT IN CONCRETE ROADS

By C. A. HOGENTOGLER, *Highway Research Board*

1. The amount of cracking and subsequent disintegrating is a function of time; thus, the rate of cracking is a measure of the life of the pavement.

2. The data show that steel reinforcement reduced the rate of cracking and thus increased the life of the pavement. This applies both to concrete pavements and other pavements laid upon a concrete base.

3. Crack reduction is more economically accomplished by the use of steel reinforcement than by additional thickness of concrete.

4. A greater reduction was afforded by small steel members closely spaced than by larger members wider spaced.

5. Increasing weight of mesh from 25 to 56 lbs. per 100 sq. ft. considerably reduced cracking.

6. Mesh reinforcement, 25 to 56 lbs. per 100 sq. ft., reduced cracks 35 to 70% in pavements of like thickness.

7. Mesh reinforcement, 25 to 56 lbs. per 100 sq. ft. and bar mat reinforcement 64 pounds per 100 sq. ft.—25% longitudinal—reduced cracks more than one additional inch of concrete, but one additional inch of concrete reduced cracks more than bars (42 to 48 lbs. per 100 sq. ft.) placed transversely only.

8. With good crushed stone aggregate, 56 lbs. per 100 sq. ft. mesh reinforcement, or 170 lbs. per 100 sq. ft. bar reinforcement, 50% each way, caused a reduction in combined transverse and longitudinal cracks equal to that indicated for 2 inches additional center thickness.

9. Mesh reinforcement of 38 lbs. per 100 sq. ft. has been effective for a thin layer of concrete laid as resurfacing upon an old concrete road.

10. One additional inch of edge thickness reduced corner cracks more than mesh reinforcement 25 to 56 lbs. per 100 sq. ft., or ⅜ to ¾ inch bar reinforcement, but progressive destruction following the appearance of corner cracks was arrested by steel reinforcement.

11. All types of steel reinforcement across cracks tended to hold together fractured slabs.

12. Bar reinforcement across transverse joint, without proper provision for slippage and clearance, resulted in breakage and subsequent expensive repairs.

13. For long slabs, 75 to 100 feet or over, edge bar reinforcement with continuous bond caused corner cracks if the area of steel exceeded ¼ sq. inch.

14. A remarkable agreement was found to exist between results of observation on roads in service and results furnished by a wide range of experimental roads and laboratory tests.

There is a balancing between longitudinal and transverse cracks, so that the results of the presence or absence of reinforcement could best be expressed by a sum of the total length of all cracks, both longitudinal and transverse.

One exception to the general statement that reinforcement is a benefit was found in the case of a few pavements which had been laid on clean sand or gravel or good macadam. As these pavements did not crack at all, it is apparent that the addition of reinforcement would have been a waste of money, unless it had furnished some benefits other than prevention of cracking.

Year's Work of the Bureau of Public Roads

Two-thirds of total Federal-aid system completed or nearing completion. Sixty-two per cent of last year's construction was gravel or cheaper, and half in the west central part of the country. All surplus war material distributed. Research work

The chief of the Bureau of Public Roads, Thomas H. MacDonald, has just made public a report of the bureau for the latest fiscal year. Some of the high lights and more important statistics contained in the report are given below.

FEDERAL AID ROADS

During the fiscal year the Federal and State government completed 11,329 miles of Federal aid roads, 30% more than the previous year and 1,082 miles more than in 1922, the previous highest record. Since the passage of the Federal aid road act in 1916, the total mileage completed has been 46,485; in addition to which, 12,463 miles were under construction at the close of the fiscal year; making about 59,000 miles fully or partly completed, in addition to which, 2,182 miles had been approved for Federal aid.

The total Federal aid system designated up to date is 178,797 miles. The states alone, without Federal assistance, completed about 65,000 miles of these roads, so that approximately two-thirds of the system is completed or under construction. If nothing happens to retard progress at the present rate, there will, within five years, be a continuous interstate highway system connecting every city of 5,000 population or larger, every section of it improved to a degree consistent with the density and character of traffic.

Of the total Federal aid mileage completed last year, the largest amount was in the West North Central states and the next largest in the West South Central. The work done in the latter constituted 8.6% of the Federal aid system in the states, which was the highest percentage of any group; while the lowest percentage was in New England—4.4%. Forty-three per cent of the mileage completed during the year was in the 16 states which comprised the East and West South Central and the Mountain groups. These were below the average in cost, however, and the total *cost* of the roads in these groups constituted only 35% of the cost of all Federal aid roads, or a cost per mile about 80% of the average for the whole country. While these three groups of states have completed from 66% to 78% of their respective total state programs for Federal aid roads, the Middle Atlantic and East North Central states have each completed only 30.4% and the South Atlantic only 39.3%.

Considering in more detail the costs of Federal aid roads last year, these averaged $13,400 per mile in the Mountain group, $14,700 in the West North Central and $18,200 in the West South Central; while the costs in the Middle Atlantic group averaged $47,600; in New England, $43,900; and on the Pacific coast, $26,500.

Of the total cost of the Federal aid roads built last year, the Federal government paid 64.3% in the Mountain states, 51.8% in the Pacific states, 47.7% in the East South Central, 46.5% in the West North Central, 46.2% in the East North Central and only 33.6% in the Middle Atlantic and 38.4% in the New England states.

Considering the class of roads built, 61.7% of the total mileage consisted of gravel, sand clay, or merely grading and drainage; 28.7% consisted of bituminous concrete, Portland cement concrete and brick; and 9.2% of waterbound and bituminous macadam. These three classes are designated by the Bureau as low, high and medium classes of construction. The low class constituted only 0.3% of the total mileage constructed in the Middle Atlantic states, while 91.9% of the mileage in the Mountain states was of the low class. In the Middle Atlantic, 90.9% of all the roads was of high class construction, while only 7.4% were of this class in the Mountain states. Of the medium class, the largest amount, 44.4%, was in New England, and the next largest, 25.4%, in the East South Central states, while only 0.3% of the roads in the mountain states were of this class.

Of the total Federal aid roads completed last year, nearly 40%, or 4,203 miles, were of gravel. "This type has been found to give excellent service under automobile and light truck traffic to a maximum of about 500 vehicles a day; and it has the further advantage that it adds greatly to the life of any pavement which may subsequently be laid upon it. As suitable gravel is widely distributed in nature, this type can be built at a very reasonable cost in most places."

The amount of sand-clay constructed was considerably less, the total being 718.8 miles. Of this total, 230 miles were constructed in South Carolina, and 218 in Georgia; the next largest amount being 89 miles in Wyoming, while no other state showed as much as 40 miles of this class of road.

The total of bituminous macadam was 911.9 miles, of which 216.3 was constructed in Tennessee, and 198.1 in Texas; the only other states constructing more than 50 miles being Virginia, with 80.2 miles, and New York, with 50.4 miles.

Of bituminous concrete, the total laid was 341.3 miles, of which 67 was laid in Arkansas, 48.1 in North Carolina, 31.9 in Alabama and 27.9 in Texas; all the other states falling below 25.

Portland cement concrete was constructed to a larger extent, than any other pavement except gravel, the total being 2,806.4. This pavement was constructed more generally than any other type, the only states not reporting such construction on Federal aid roads being Alabama, Idaho, Kentucky, Louisiana, Maine, Montana, North Dakota and South Dakota. Illinois, with 366.1 miles, constructed the greatest length of Federal aid road of concrete, the next in order being New York, with 289.2 miles, and Indiana with 207.0 miles. Pennsylvania built 154.0 miles, Michigan 147.5, Texas 133.4, Oklahoma 128.6, Kansas 126.3, Missouri, 124.4, North Carolina 122.9, Virginia 107.3, and Ohio 101.3. The others all fell below 100, the minimum being Wyoming with 1.4.

VALUE OF FEDERAL AID

Among the outstanding projects made possible by Federal aid, and especially by the provision of the law which permits the payment of considerably more of 50% of the cost in some of the western states, is the Wendover Cut-off in Utah, across the Great Salt Lake Desert, which cost $380,000, of which $284,000 was paid by the Federal government. "Since this cutoff passes through a section of the state of Utah that is practically uninhabited, it is doubtful whether this essential interstate link ever would have been built but for the government participation."

Several of the paragraphs of the report apparently were written with the idea in mind of their bearing upon the threatened abolishing of Federal aid, the last sentence in the previous paragraph being one of these. Among other statements are the following: "In the sparsely settled states of the West, the Federal participation is a vital necessity and a definite obligation. The sections of the Federal aid system in these states partake more of the character of interstate or national roads than of roads for local traffic. The mileage to be provided is so great that without the Federal contribution, the work could not be done in a generation; and to this reason there is added the still more compelling one that is involved in the ownership of vast areas of land by the United States which are not taxable by the states."

Status of Federal Aid Highway Construction

As of October 31, 1925

FISCAL YEAR 1925-1926:

States	*PROJECTS UNDER CONSTRUCTION Estimated Cost	Federal Aid Allotted	Miles	PROJECTS APPROVED FOR CONSTRUCTION Estimated Cost	Federal Aid Allotted	Miles	Balance of Federal Aid Fund Available for New Projects
Alabama	$10,322,000.26	$5,031,107.84	535.4	$378,592.64	$175,050.00	11.6	$2,243,745.71
Arizona	2,051,812.12	1,308,811.30	166.1	176,977.10	108,150.70	26.7	1,982,862.00
Arkansas	5,904,602.02	2,825,489.13	381.9	1,164,378.38	549,903.60	96.4	464,244.50
California	10,448,983.86	5,251,917.12	319.5	1,203,924.54	489,986.35	39.3	2,344,113.26
Colorado	4,527,389.17	2,257,693.88	221.9	338,945.90	190,092.34	35.3	2,090,904.77
Connecticut	1,713,128.78	549,559.48	26.9	204,505.29	48,608.15	2.3	1,192,504.57
Delaware	980,042.66	388,784.75	22.6	.....	.....	.....	10,912.65
Florida	8,970,318.13	4,370,709.60	251.7	1,991,337.04	650,530.77	41.5	761,040.66
Georgia	11,092,111.41	5,226,115.36	705.1	1,170,995.66	483,749.27	87.9	343,478.47
Idaho	2,750,264.23	1,733,255.24	177.0	933,074.03	562,087.44	41.2	410,995.58
Illinois	8,644,745.27	4,189,261.40	290.9	.....	.....	.....	3,486,503.10
Indiana	17,584,862.01	8,240,153.23	479.8	832,279.23	413,698.33	25.8	507,614.92
Iowa	7,272,120.64	3,265,326.98	457.5	1,480,053.73	699,848.90	144.3	2,032,060.07
Kansas	10,670,447.84	4,512,216.72	517.9	1,787,131.43	505,704.68	104.6	1,405,301.41
Kentucky	7,871,365.04	3,511,429.76	310.0	517,209.81	258,604.89	27.3	1,158,679.62
Louisiana	2,772,603.62	1,325,240.49	108.8	582,979.67	290,987.40	21.9	964,233.21
Maine	1,311,335.31	551,480.38	42.2	976,766.16	394,636.81	35.6	841,532.89
Maryland	2 814,750.06	1,244,591.15	126.3	.....	.....	.....	19,267.55
Massachusetts	6,155,325.67	1,629,813.05	86.9	523,237.49	173,035.13	8.1	1,584,145.94
Michigan	12 044,705.07	5,523,127.94	328.5	433,069.40	158,370.99	0.3	2,709,474.16
Minnesota	7,353,175.06	2,888,700.00	608.9	1,023,293.92	171,600.00	44.9	156,347.89
Mississippi	8,337,386.37	4,162,437.53	437.0	1,083,118.42	541,559.18	61.1	575,708.32
Missouri	25,921,368.10	10,264,311.41	763.8	1,362,237.84	115,523.89	32.3	416,546.56
Montana	1 848,094.85	1,344,221.16	186.3	1,003,571.06	544,458.41	117.9	4,192,949.30
Nebraska	8,761,990.25	4,347,216.75	887.7	2,420,926.59	1,190,961.25	213.4	2,458,438.10
Nevada	5,394,643.05	4,528,235.45	468.2	44,370.41	38,821.72	5.6	60,264.11
New Hampshire	1,265,074.57	593,106.22	40.4	.....	.....	.....	168,221.90
New Jersey	9,870,567.74	3,453,916.40	81.2	.....	.....	.....	50,612.83
New Mexico	2,346,169.27	1,460,967.04	216.2	272,777.67	190,930.39	17.4	1,567,863.41
New York	33,598,825.75	10,621,551.55	661.6	7,123,300.00	1,746,285.00	116.5	4,238,734.33
North Carolina	8,215,648.74	3,469,733.68	199.4	1,787,907.60	762,380.84	45.0	22,224.65
North Dakota	4,135,034.60	2,087,553.65	525.1	920,498.80	442,127.40	91.4	1,461,422.86
Ohio	12,171,583.58	4,626,722.20	373.6	1,938,733.00	626,940.22	47.0	1,807,843.28
Oklahoma	7,116,638.73	3,399,770.16	333.5	811,141.63	275,053.59	31.5	261,223.21
Oregon	3.232,666.90	1,896,373.89	170.9	508,820.95	137,767.25	23.1	130,528.18
Pennsylvania	36,004,538.70	9,640,406.67	651.5	2,463,989.12	826,309.13	61.8	468,514.51
Rhode Island	2,543,268.84	681,939.59	37.3	263,012.75	63,135.00	4.2	437,181.32
South Carolina	6,010,468.86	2,824,091.69	328.9	957,481.91	378,231.95	61.5	68,261.08
South Dakota	6,588,931.26	3,107,824.85	936.1	86,427.58	48,425.04	14.0	55,151.56
Tennessee	9.992,630.24	4,427,733.01	337.8	241,502.80	119.851.60	11.3	1,120,869.59
Texas	21.883,492.49	9.586,100.94	1265.6	4,914.240.46	2,212.696.79	323.1	994,536 35
Utah	3 224,624.68	2,193.626.23	255.5	325,575.07	246,654.73	16.9	611,529.78
Vermont	1,906,002 42	841 367 56	43.0	77.750.79	38,875.39	3.3	480,526.26
Virginia	7,223,621.89	3.162,898.69	229.9	1,415,814.00	607,931.27	51.7	89.142.00
Washington	2,426,786.31	1.115,400.00	74.9	.....	.....	.....	927.196.74
West Virginia	6,774.986.54	2.719,659.25	179.1	981,982.41	367.090.29	35.2	118.518.24
Wisconsin	5.850.782.11	2.876,686.58	281.4	621 435.40	312.333.00	40.6	3.406.366.63
Wyoming	3.408 827.94	2,141.606.24	221.4	73,606.61	47,255.00	9.9	181.048.51
Hawaii	342.277.22	97.440.00	6.5	.....	.....	.....	637,088.00
Totals	$389,653,019.33	167,497,682.59	16359 6	47,418,974.29	$18.206,344.08	2230.7	$53,716,474.54

*Include projects reported completed (final vouchers paid) totaling: Estimated cost, $96,991,426.65; Federal aid, $43.376,227.96; Miles, 4172.4.

SURPLUS WAR MATERIAL

Under the head of "Surplus War Material," the report states that "Except the explosives, of which there is still a supply to be distributed, the distribution of war materials declared surplus by the War department is now practically completed. Since the fiscal year 1920, when the distribution was begun, materials of an estimated value of more than $247,000,000 have been distributed to state highway departments, other branches of the Federal establishment, and to farmers." By far the largest part of this amount, a total of a little over $215,000,000 was turned over to the states themselves. New York received the highest value of material, totaling $11,345,426. Texas was next with $11,227,260. The amount received by the other states ranged between two million and eight million in most cases, a few of the smaller states falling below one million, Delaware being the lowest with $495,685.

RESEARCH WORK

The report refers to the research made by the bureau in methods of constructing concrete pavements and the aid which this furnishes to highway contractors. It is stated that, taking advantage of these studies, one contractor reduced his labor cost from 45.7c per square yard to 20.3c; and another contractor reduced his cost from 20.7c to 12.8c, having increased his output from a 7-day average of 64 feet per hour to an average of 97 feet and a day's run of 1,263 feet.

Physical researches were made on subgrade materials, stresses in concrete roads, bridge design, impact of motor trucks, bituminous and concrete road materials; also economic research in highway transportation and highway financing and the effect of highway improvement on land values.

Prize Essay On Improved Highways

The American Road Builders' Association offers $550 in prizes for the best essays on "The New Country by Improved Highways," which is open to all college students. The essays must be submitted before January 1, 1926, to the Essay Contest Committee, care of the American Road Builders' Association, Congress Hotel, Chicago. The prizes will be awarded during the Good Roads convention. There will be five prizes of $200, $100, $50, $25 and $25 in cash, or slightly larger amounts toward defraying college expenses.

The essay must not exceed 600 words; must be typed on one side only and signed by the writer on the top of the first page; it must give the name of the college, and be signed by a professor. The essays will be judged on originality, knowledge of the subject, English structure and general appearance. The judges will consist of William H. Connell, C. R. Ege, Thos. H. MacDonald, S. S. Steinberg and A. H. Blanchard.

Protests Selection of "United States Highways"

The secretary of the Motor Club of Harrisburg, Pa., has issued a statement calling attention to the fact that in designating roads as "United States Highways," the Joint Board on Interstate Highways, appointed by the Secretary of Agriculture, has ignored Pennsylvania, New York and other eastern states, including Maryland, which has already rejected the plan, claiming that the scheme of selection and numbering of roads was dictated by the middle west. He states that while the board gave Pennsylvania only four United States roads, about every highway in Ohio, Indiana, Illinois and nine other states in that section of the country were included in the list. The plan calls for only one road between New York and Cleveland, but ten roads between St. Paul and Kansas City, approximately the same distance, although there is ten times as much traffic between the two cities first named as between the two middle west cities.

Highway Program for Cuba

Cuba is planning to construct a highway system to extend the entire length of the island from Pinaro del Rio through Havana to Santiago, a distance of about 500 miles. From this central highway branch roads will radiate to important centers. The cost is estimated at more than 380 million dollars. It is hoped to complete the work in four years. Transportation and gasoline taxes are to be imposted to defray part of the expense of construction and maintenance.

A considerable part of the work is to be laid with granite blocks and it was reported a few days ago by Trade Commissioner R. M. Connell of Havana that the secretary of public works has changed the specifications for blocks to United States standards, which were not used in the original specifications. It was expected that bids will be called this month for about 40 million blocks, 8 million to be used in and about Havana and 32 million for roads in Havana province. Bids will be asked for on the blocks alone, on laying alone, and on both furnishing and laying.

Chlorination Process Patent

On November 10th, U. S. District Judge E. J. Campbell, of the Eastern District of New York, handed down his decision in the suit of the Electro Bleaching Gas Co. and the Wallace & Tiernan Co. against the Paradon Engineering Co. for infringement of the Ornstein patent No. 1,142,361 which covers the solution feed process of chlorination of water and sewage. Judge Campbell found that the patent was valid; that the apparatus of the defendant infringed the patent knowingly, two of the officers of the defendant's company being former employees of the Wallace & Tiernan Co. The Electro Bleaching Gas Co. is the owner of the patent, and Wallace & Tiernan, the sole licensee, joined it in prosecution of the suit. The court found that none of the citations of the prior art set up by the defendant showed anticipation of the Ornstein solution process. It orders the usual decree, including an injunction and determination, by referee, of the defendant's profits and damages to the plaintiffs.

The Paradon Engineering Co. announces that it will carry the case to a higher court.

Recent Legal Decisions

ROAD AND BRIDGE CONSTRUCTED BEFORE CONDEMNATION PROCEEDINGS CARRIED THROUGH

The Virginia Special Court of Appeals holds, Hannah v. Board of Supervisors of Buckingham County, 125 S. E. 679, that where a bridge and roadway were constructed after condemnation proceedings had been begun and before the proceedings had been dismissed for irregularities, without compensation to the landowner, the work having been done in good faith, it was proper to enjoin interference with the public use of the bridge and roadway for such time as the court should deem necessary to perfect title to the property, but an unconditional injunction was error.

ROAD CONSTRUCTION CONTRACT HELD VOID WHERE STATUTE NOT COMPLIED WITH

The Mississippi Supreme Court holds, Amite County v. Mills, 102 So. 465, that under Miss. Code §7162 it is necessary that an engineer be employed to make an estimate of the cost of constructing and maintaining the highway or highways to be improved, and that such estimate embrace the work to be done and its approximate cost, and that this survey and estimate be approved by the road commissioners and by the board of supervisors, before a valid contract can be made for the work, and where the statute is not complied with in this respect a contract made thereunder is void and the board of supervisors is not liable for the work done or the improvements made. It is also held that the contractor could not recover for work actually done on a quantum meruit, although the county had acquiesced in the work, made partial payments on it and used the road.

STATUTORY PROCEDURE FOR VACATING AND CLOSING A HIGHWAY MUST BE FOLLOWED

The Washington Supreme Court holds, Elsensohn v. Garfield County, 231 Pac. 799, that in proceedings before a board of county commissioners to vacate and close a highway, the failure to post and publish notices as the statute requires, and to take a bond as provided in the statute at the time of entertaining the petition, are jurisdictional matters, and without complying with the statute in these respects the board had no jurisdiction to proceed with the matter.

LIABILITY FOR DEFECTIVE HIGHWAYS

In an action against a county and a township for personal injuries caused by a defective highway, the South Dakota Supreme Court holds, Hanigan v. Minnehaha County, 201 N. W. 522, that, although under S. Dak. Rev. Code 1919, §§8589, 8590, an organized civil township was liable for defective maintenance of county highways, a civil township since Laws 1919, c. 333, has no longer any power or duty as to the maintenance of county highways, section 29 of that act placing such duty on the county board. And there being no express statute permitting recovery from counties of damages caused by negligence in the maintenance of a highway in an organized civil township, the county was not liable for the failure of its officers to repair a bridge on such a highway.

SURETY'S LIABILITY FOR GRAVEL FURNISHED AFTER TIME FOR COMPLETION OF CONTRACT EXTENDED

A county road construction contract provided for completion of the work before a specified date. In an action on the contractor's bond, defendant surety contended that no recovery could be had against it for gravel furnished after that date. The bond on which defendant's liability to persons furnishing material rested contained an express agreement on its part to an extension of time to the principal, without notice to the surety. The Michigan Supreme Court holds, Sommers v. National Surety Co,, 229 Mich. 422,201 N. W. 443, that, as the contractor was allowed to continue the work after the time for performance had expired, it would be presumed that an extension was granted by the county road commissioners, and the surety was liable for gravel furnished after the expiration of the originally stated time for performance.

DISQUALIFICATION FROM VOTING ON HIGHWAY DISCONTINUANCE

The Michigan Supreme Court holds, Patterson v. Township Board of Ravenna Tp., 229 Mich. 133, that where certain members of a township board were interested as stockholders, directors and officers of a power company which would be benefitted by the discontinuance of part of a highway, they were disqualified from voting as members of the board on such matter.

WHEN HIGHWAY OFFICIALS LIABLE TO PRIVATE INDIVIDUALS

The Minnesota Supreme Court holds, Stevens v. North States Motor, 201 N. W. 435, that the liability of a highway official to a private individual for failure to perform a duty imposed upon him by law, attaches only when his duty is ministerial (that is to say mandatory, under some legal authority and to be done in a prescribed manner) and his failure to act is the proximate cause of the injury. If the duty is a purely public one, owing to the state, then a failure to perform it will not give rise to a cause of action in favor of the individual. Therefore a road overseer is held not liable to one injured on a public highway because of his failure to keep it in repair and safe for travel.

LOWEST RESPONSIBLE BIDDER—ADVERTISEMENT FOR BIDS

The New Jersey Supreme Court holds, Homan v. Board of Education of Camden, 127 Atl. 824, that an advertisement for bids for construction of a school building which requested that the time be stated within which the building would be finished, did not justify an award to other than the lowest bidder, under 4 Comp. St. p. 4741, §53, requiring contracts to be awarded to the lowest responsible bidder, since no common standard for competition was set up. The fact that the lowest bidder had de-

layed the completion of prior contracts with the board was held no legal excuse for not complying with the statute.

ESTIMATE WITHHELD WHERE GRAVEL FURNISHED DID NOT CONFORM TO CONTRACT

A road contractor's contract provided that the gravel placed on a state highway would pass through a screen of 2½-inch mesh. After a number of estimates for work and material had been given, an estimate for work and 2,500 yards of gravel was refused by the county engineer because many of the pebbles would not pass through a 2½-inch mesh. The Michigan Supreme Court, held, Hull v. Board of Road Comrs. of Lapeer County, 230 Mich. 685,203 N. W. 474, that the contractor was not entitled to an estimate under Pub. Acts 1917, p. 221, §63, although it was contended that because of the cold weather the oversize stone could not be taken out until spring, and that it was unfair to hold up the estimate until then.

MUNICIPALITY MAY CARRY COMPENSATION INSURANCE UNDER MINNESOTA ACT

The Minnesota Workmen's Compensation Act does not compel a municipality to carry insurance, but the municipality may carry such insurance if it so chooses. An injured employee who has a common-law action against a third person for negligence and also a claim against his employer under the Compensation Act, may pursue both. If he claims and receives compensation from his employer, the employer, by the statutory subrogation, Gen. Stat. 1923, §4291, subd. (2), may bring the common-law action against the wrongdoer; but the payment or obligation to pay the award on the part of the employer is a condition precedent to his right to prosecute such action. Where a street sweeper was injured in a collision between automobiles and the award under the Compensation Act was paid by an insurance company, pursuant to a policy held by the city, and the city paid nothing, the Minnesota Supreme Court held, City of Red Wing v. Eichinger, 203 N. W. 622, that since it had suffered no damage it was not the real party in interest and could not maintain an action against the negligent third party who caused the injury.

SEWER CONNECTION REQUIREMENT NOT LIMITED TO HOUSES ABUTTING ON STREET

The South Carolina Supreme Court holds, City of Columbia v. Shaw, 127 S. E. 722, that an ordinance requiring owners of premises on the line of city sewers to connect therewith was not limited in its operation to houses facing or immediately abutting on the street in which the sewer main is laid; otherwise houses erected at the rear of a long lot with a narrow front to the street would be exempt.

ORDINANCE REQUIRING REMOVAL OF GAS FILLING STATIONS FROM CURBING HELD WITHIN MUNICIPAL POWER

The Iowa Supreme Court holds, Eduburn v. City of Creston, 202 N. W. 580, that since it is the duty of city councils to keep the streets free from obstructions and nuisances, the court cannot pass upon the wisdom of an ordinance requirring the removal of gas filling stations from the curbs of congested streets; and injunction of the enforcement of such an ordinance was refused.

MUNICIPALITIES MAY COMPROMISE LAW SUITS

The Minnesota Supreme Court holds, Oakman v. City of Eveleth, 203 N. W. 514, that a municipality may compromise pending litigation at any time before final judgment. After final judgment it may compromise and accept less than the full amount of the judgment, where the debtor is not able to pay the full amount. A taxpayer instituted a suit against former city officials to collect money for the city. The city failed to act; yet it was held that the city might compromise and settle the pending litigation.

STATE MAY BE SUED ON CONTRACT WITH DEPARTMENT OF PUBLIC WORKS

The Nebraska Supreme Court holds, Peterson v. State, 203 N. W., 1002, that an action founded upon a contract with the department of public works, which has been previously authorized by the and when a claim arising out of such a contract Legislature, is essentially a contract with the state, has been presented to the auditor of public accounts, and disallowed by him, in whole or in part, an action may be brought thereon against the state.

POWER TO MAINTAIN PUBLIC GOLF COURSE ADJACENT TO CITY

The Minnesota Supreme Court holds, Booth v. City of Minneapolis, 203 N. W. 285, that power to acquire and maintain parks includes power to acquire and maintain a public golf course, since a park is a pleasure ground for the recreation of the public to promote its health and enjoyment and a public golf course is for the same purpose. Authority in a city charter to maintain parks adjacent to the city would include land 1½ miles from the city, adjacent tracts being defined as those which are not widely separated.

CITY HELD NOT LIABLE FOR FAILURE TO KEEP HYDRANTS IN ORDER

In an action against a city for fire losses alleged to be caused by the city's negligent failure to keep the street hydrants in working order, the New Hampshire Supreme Court holds, Stevens v. City of Manchester, 127 Atl. 873, that, in the absence of a statute giving right of action, the city was not liable for such failure. The city entered upon the work of voluntarily supplying water for the extinguishment of fires on private property. It was under no obligation to undertake the work, or to continue it, or to do it in any particular way. There being no duty, there was no negligence. The court holds that when, in the course of the performance of work voluntarily undertaken by a municipality in its private capacity, its agents are brought into relation with a third party, a duty arises to refrain from negligent injury to him; but if the municipality does nothing, no liability is incurred. Such a liability cannot be predicated on mere misfeasance, or non-action, as the failure to supply water to extinguish fires on private property. It is held immaterial that the city also maintained its waterworks for the purpose of supplying water to individual users, and collected pay therefor.

NEWS OF THE SOCIETIES

Jan. 21-23—AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual meeting at New York, N. Y.

Jan. 22-23 — INDIANA SECTION, AMERICAN WATER WORKS ASSOCIATION. Annual meeting at Claypool Hotel, Indianapolis, Ind.

Jan. 22-24—HIGHWAY ENGINEERS' ASSOCIATION. Eighteenth annual convention at Hotel Statler, St. Louis, Mo.

Jan. 31—NORTHEASTERN SECTION, AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual meeting at Boston, Mass.

Feb. 24-27—AMERICAN CONCRETE INSTITUTE. Annual meeting at Chicago, Ill.

April 27-May 1—AMERICAN WATER WORKS ASSOCIATION. Annual convention at Brown Hotel, Louisville, Ky. Secretary, Wm. Niesley, 170 Broadway, New York.

INDIANA SANITARY AND WATER SUPPLY ASSOCIATION

The 1925 meeting will be held at the Claypool Hotel, Indianapolis, on January 22nd and 23rd. This will be the first meeting of the body as a section of the American Waterworks Association and several of the national officers will be present. On the afternoon and evening of the 22nd the society will hold a joint meeting with the Indiana Utilities Association.

Thursday morning, following the president's address by W. H. Younce and the report of the secretary-treasurer, C. K. Calvert, F. C. Jordan will extend the welcome to the American Waterworks Association.

The remainder of the first session will be devoted to fire matters, J. J. O'Brien, fire chief of Indianapolis, delivering an address on the subject, "Keeping up the Team Work," which is to be followed by discussions on the subjects: "What Are the Dangers in Furnishing City-Wide Fire Pressure?", and "Do Not These Dangers Overbalance the Value of the Service?" There will be a banquet at 6:30 P. M.

On Friday morning at 8:30 there will be an inspection of the meter maintenance department of the Indianapolis Water Company. At the morning session the resolutions committee will present its report and there will be addresses by Richard Lieber on "Stream Flow and Water Power in Indiana," and by J. D. Berg on "When Are Electrically Operated Pumps Economical?" There will be discussions on the following subjects: "Service to Large Consumers"; "What Part of the Daily Total Pumpage Is Used in Quantities of 100,000 Gallons or More?" "Are Additional Consumers at the Present Rates Profitable?" In the afternoon there will be the election of officers for the ensuing year. The subjects to be discussed are: "Night Pumpage Rates—What Percentage of the Total Pumpage Occurs from 12 to 6 A. M.?" "Who Uses Water Pumped at Such Hours?" Dean H. M. Potter will describe "The Purdue University Service for Water Plant Operators" and J. W. More "Maintaining Efficient Deep Well Systems." The meeting will conclude with a discussion on "New Waterworks Construction."

BOSTON SOCIEY OF CIVIL ENGINEERS

On January 28 this Society will listen to an address by Col. C. H. Birdseye, chief topographical engineer of the U. S. Geological Survey, on the subject, "Surveying of the Grand Canyon of the Colorado." Colonel Birdseye was in charge of the party which surveyed 251 miles of the Grand Canyon in the fall of 1923.

NORTHEASTERN SECTION, AMERICAN SOCIETY OF CIVIL ENGINEERS

The annual meeting of this Society will be held on January 31 when O. C. Merrill, executive secretary of the Federal Power Commission, will speak on the desirability of the inauguration of a program of river studies which will make it possible to prepare comprehensive developments on major streams in the combined interests of power development and navigation.

SAN FRANCISCO SECTION, AMERICAN SOCIETY OF CIVIL ENGINEERS

At the annual meeting of this society on December 16 the following members were elected:

President, H. C. Vensano; vice-president, N. A. Eckart; secretary-treasurer, F. H. Fowler.

DAYTON SECTION, AMERICAN SOCIETY OF CIVIL ENGINEERS

This section has elected the following officers:

President, C. D. Putnam; vice-presidents, F. J. Cellarius and J. K. Grannis; secretary-treasurer, C. H. Eiffert.

LEAGUE OF CALIFORNIA MUNICIPALITIES

The Twenty-Sixth Annual Convention of this organization was held at Monterey on October 6th to 8th. It had been intended to hold the convention in the Hotel Del Monte, but owing to the burning of this hotel a short time before, it was necessary to use the Asilomar and to shorten the convention from five days to three.

President Charles N. Kirkbride presided. The Mayor of Monterey, Benjamin F. Wright, welcomed the delegates. The executive secretary, William J. Locke, gave a report upon the affairs of the society and H. A. Mason, secretary-treasurer, presented the financial report. The Monday morning session closed with a paper entitled, "Expediting Community Developments Through Proposed Legislation," by G. Gordon Whitnall, director of the Los Angeles City Planning Commission.

The Monday afternoon session opened with an address by Past-President Beverly L. Hodghead, followed by a discussion of Mr. Whitnall's paper by Norman E. Malcolm and others. The subject of "Community Building" was discussed by Charles E. Ashburner, city manager of Stockton. John Eddy, city manager of Berkeley, spoke on the subject, "How Berkeley has made use of the Bureau of Public Administration of the University," highly commending the work of the Bureau. "Should the City Impose a Gasoline Tax?" was the subject of a paper by Archer Bowden, city attorney of San Jose.

The evening session was devoted to a paper by Charles R. Raitt, superintendent of playgrounds of Los Angeles, entitled, "The Municipal Camps of Los Angeles," illustrated with lantern slides.

Tuesday morning's session opened with a discussion of local problems, Mr. Ashburner asking for an expression of opinion as to the value of automobile camps to a community. Quite a number replied, and the general consensus of opinion seemed to be that it was not desirable for municipalities to operate auto camps, but if they were operated they should be under private ownership, with fees charged sufficient to reimburse the owners. Following this, Robert L. Shinn, city attorney of Sacramento, addressed the Convention on certain pending constitutional amendments. A paper, "Proposed Amendments to Our State Zoning Law," was read by Frank D. Stringham, mayor of Berkeley. Albert A. Rosenshine spoke on the subject, "Suggested Amendments to Our Election Laws." Professor Samuel C. May discussed the subject of "Selling Good Government to the People." The activated sludge plant at Lodi was described by L. F. Barzellotti, city engineer of Lodi. On Tuesday evening Charles E. Hewes spoke on the subject, "Review and Pre-view of the Power Situation in California," which was illustrated by moving pictures.

The Wednesday morning meeting was in charge of the City Managers Association of California with Clifton E. Hickok, city manager of Alameda, as chairman. Mr. Hickok stated that there were at present thirty-three city manager cities in California and 326 in the United States with a combined population of 6,000,000 people. H. F. Scoville, city manager of Monrovia, spoke on the subject, "The Value to the City Manager of a Civic Spirit," and C. W. Koiner, city manager of Pasadena, on "Functions of an Assistant City Manager." Many of the city managers present discussed the desirability of assistant city managers, the

majority of them apparently agreeing that something of the kind was desirable, whether called assistant city manager, deputy, secretary, etc. H. C. Bottorff, city manager of Sacramento, spoke on the subject, "How far should the city go in commercial enterprises?" At the end of the morning session, the City Managers Association, as such, held a business meeting, electing officers and transacting other business.

On Wednesday afternoon, J. H. Jamison, budget control officer of the City of Berkeley, spoke on the subject of "Budget Control." Professor Charles Gilman Hyde, professor of sanitary engineering of the University of California, presented a paper, "Some Modern Processes of Water Treatment and What May Be Expected of Them," which title he stated should be changed to read "Responsibility of public officials with respect to the quality of water supplied to consumers and some of the processes which may be utilized to make those waters satisfactory in every respect." Following this paper, C. C. Kennedy spoke on the subject, "Preparing the Plans and Specifications for Street Work." The Committee on Resolutions then made its report, as did also the Auditing Committee, and the Nominating Committee reported its nominees headed by Norman E. Malcolm, city attorney of Palo Alto, for president, which nominees were elected. Invitations for the 1925 meeting were extended from Yosemite, Sacramento, Santa Barbara and others. Long Beach was chosen by vote of the Convention.

MISSOURI HIGHWAY ASSOCIATION

The eighteenth annual meeting of this Association will be held in St. Louis, Mo. January 22nd to 24th, with convention headquarters at Statler Hotel. On the morning of the 22nd, following the official addresses, Ed S. Austin will read a paper entitled, "Engineering From the Outside," and E. W. James will speak on "Federal Aid." The afternoon will be devoted to an automobile trip through the city and county. On Friday morning, after thirty minutes of moving pictures, S. S. Connett will speak on "Your State Highway Commission"; John M. Malang will discuss "Proposition Number Five and Relation of Counties and Subdivisions to the Missouri Road System," and R. R. Benedict will describe, "Results of the Bates Road Tests." The afternoon session as well as that on Saturday morning also will open with thirty minutes of moving pictures. V. H. Elliston will discuss "Problems of the County Highway Engineer"; D. O. Thomas will read a paper entitled "Bridge and Culvert Construction and Maintenance"; following which there will be general discussion on "Estimating Highway Construction Work," led by Robert Brooks.

On Saturday morning R. C. Barnett will speak on "Elements of Highway Transport"; B. H. Piepmeier will explain "Missouri's Road Program"; and Senator William Painter will speak on "The County Road System." The session and convention will end with an open meeting for short talks from engineers and contractors, a business session and election of officers.

AMERICAN ROAD BUILDERS' ASSOCIATION

The annual convention of this association, January 6th to 9th, compared favorably with that of last year in the matters of attendance and of value of the papers and discussions. The Road Show was larger than ever before and received close examination by hundreds of highway officials. The management of the entertainments, as well as of the show and convention, under the guidance of Charles M. Upham, left no room for criticism.

Mr. Upham has been reemployed by the directors as business manager of the 1926 show and convention. The idea of holding sectional conventions (without shows) in different sections of the country during the year will be considered at the annual meeting in May. Resolutions were adopted relative to Mr. Blair, who died two weeks before the convention, and William Ogden, of the Lakewood Engineering Co., was elected to succeed him as director. William H. Connell, engineer executive of the Pennsylvania State Highway Department, was announced to have been elected president by the letter ballot.

There were 287 exhibitors at the road show, 55 more than last year. A bare list of the exhibitors would be of formidable length. They included practically all manufacturers of trucks, tractors, trailers, industrial locomotives, power shovels, graders, scrapers, rollers, finishing machines, snow plows, traffic line markers, traffic signals and every kind of machinery and appliance used in constructing and maintaining highways.

PERSONALS

Farnum, Henry H., formerly engineer of sewers, Borough of the Bronx, New York City, died recently at the age of 80 years.

Marsh, J. O., for seven years office engineer of the California State Highway Association, has been appointed chief engineer of the Los Angeles Board of Public Utilities.

Van Norman, H. A., for fifteen years in the employ of the city of Los Angeles, has been appointed city engineer of that city.

Harder, H. J., city engineer of Paterson, N. J. since 1900, has been transferred at his own request to the position of resident engineer to represent the city in the work of eliminating grade crossings, which is to be done by the Erie Railroad by contract with the city.

Steece, Col. James Gordon, president of the Alaska Road Commission, was apparently the furthest from home of any attendant at the Chicago Road Show, being 4500 miles from his headquarters and 7500 miles from his nearest road job.

Jackson J. Frederick, formerly director of the Bureau of Sanitary Engineering, Connecticut State Department of Health, and chief engineer of the Industrial Wastes Board, has severed his connection with the Department of Health and opened offices for private practice in the Chamber of Commerce Building, New Haven, Conn.

Diven, John M., died January 4th at the age of 73 years. He was for 25 years secretary of the American Water Works Association.

Walbridge, Geo. B., vice-president of Walbridge-Aldinger Co., contractors of Detroit, Mich., has been elected president of the Associated General Contractors of America.

U. S. CIVIL SERVICE EXAMINATIONS

Junior Engineer. Examinations January 21st. To fill vacancies in various branches of Government service. Entrance salary, $1,800 a year. To make routine testing, drawing plans for minor projects, field work, computations, assist in conducting experimental research tests, compiling reports, handling technical correspondence and the like.

Fuel Engineer, Associate Fuel Engineer, Assistant Fuel Engineer. Applications received until February 3rd. To fill vacancy in Bureau of Mines, Department of Interior. Entrance salary, $3,800, $3,000 and $2,400 a year, respectively. To conduct, under general direction, laboratory and field investigations especially in combustion, furnace design, smoke prevention, heat transmission, efficiency of fuel using devices, prepare concise and intelligent reports thereon, assist in boiler tests and other furnace and auxiliary equipment for fuel efficiency, fuel burning methods and machinery investigations, fuel inspection and sampling, data compilation.

Highway Economist, Associate Highway Economist, Assistant Highway Economist. Applications received until February 3rd. To fill vacancies in Bureau of Public Roads, Department of Agriculture and duty in Washington, D. C., or in field. Entrance salary, $3,800, $3,000 and $2,400 a year, respectively. To (1) assume responsibility, under general administrative supervision, individually or with associates or subordinates, for initiating, planning and carrying out major research investigations in highway economics; (2) perform, individually or with small number of trained assistants, major research investigations in highway economics also in consultation with superior to determine matters of policy for organization, scope, management and analysis of research projects; (3) perform research investigations in highway economics.

Junior Engineer and Deck Officer. Applications received until June 30th. To fill vacancies in Coast and Geodetic Survey. Entrance salary $2,000 a year. Requirements: Three and one-half years of civil engineering course, or geodesy and surveying course for C.E. or B.S. degree in college, university or technical school of recognized standing with one of the two degrees before appointment.

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

NEW FIVE-TON "CATERPILLAR" TRACTOR

A new 5-ton "Caterpillar" tractor has recently been announced by The Holt Manufacturing Company, with factories at Peoria, Illinois and Stockton, California. The new model embodies many new and distinct features, tending toward greater accessibility, dependability and economy. The outstanding feature of the new design is unit construction; three units, the engine, transmission and track units, forming the complete tractor.

The motor is a 4 cylinder, valve-in-head type; bore 4¾"; stroke 6"; 1,000 r. p. m.; gear-driven fan and water pump; full force feed lubrication. Special attention has been given to compactness and complete accessibility. Large side plates provide for bearing inspection and adjustment.

The transmission is selective gear type with three speeds forward and one reverse. Forward speeds are: first 1.75; second 3.00; third 4.25 m. p. h.; reverse 2.00. In each speed, power is applied to the sprocket with but three gear contacts. All shafts are mounted on heavy duty ball and roller bearings. Steering clutches provide independent, yet positive drive to each track; no differential is employed.

The entire weight of the tractor is carried on the roller frame through a 3 point spring mounted suspension. The truck frame incorporates marked simplicity in design, yet permits operation of each side to accommodate itself to the inequality of ground surface. A new and unique feature is the drive link and spring construction, which permits the centers of the drive sprocket and track idler to approach each other so that the drive sprocket can slip over the space blocks, should an obstruction gain access to the track unit. The track shoes and rails are cast integral of high carbon steel, specially heat treated. The track shoes are 12 inches wide.

The new model has been designed to meet the exacting demands in the medium power field. While nominally rated at 25 drawbar horse-power it has a substantial reserve for all conditions. It is designed especially for township, municipal and special road districts, for average road grading, with flexibility, speed and economy for maintenance and patrol operations.

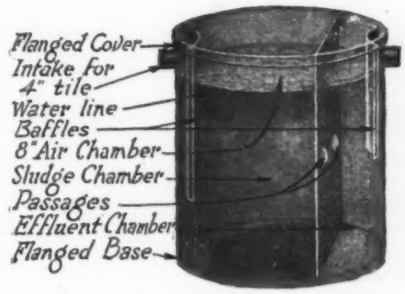
STANDARD GUARD CABLE

The Standard Guard Cable Company of Williamsport, Pa., manufacture cables for highway guards which they claim exceed the demands of highway engineers, their special features being strength, uniformity of quality and calibration, perfection of stranding, and delivery in a form handy to install. These cables are thoroughly galvanized.

SAN-EQUIP SEPTIC TANKS

The Chemical Toilet Corporation of Syracuse, N. Y., manufactures a septic tank which is shipped ready for installation for residences, factories and small communities up to 400 or 500 population. This tank is cylindrical in shape, supplied with baffles and a flanged cover, constructed of 14-gauge copper alloy iron, rustproof enameled, the depth running generally about 48 inches. They claim that, with 50 to 60 pounds of enamel on the smallest tank (adapted for seven people only), the iron is proof against rust.

Sewage enters the tank at one side, passes down and under a baffle, through two openings in a plate which divides the tank into two chambers, the larger known as the sludge chamber and the smaller as the effluent chamber, thence under another baffle and through an outlet pipe. The capacities of the tanks are based on about 16 or 18 gallons per capita for the largest size up to 16 to 33



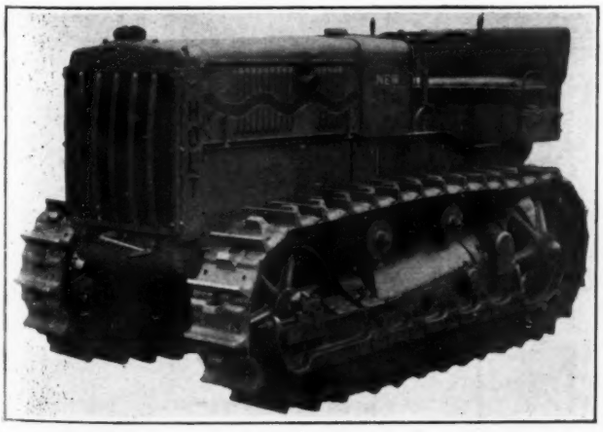
THE SAN-EQUIP SEPTIC TANK.

gallons for the smallest size, the capacity being made largest for schools, smallest for the home and intermediate between these two for factories. The effluent from the tank is supposed to be carried through underground tiles to a filter area where it is further purified by subsurface irrigation.

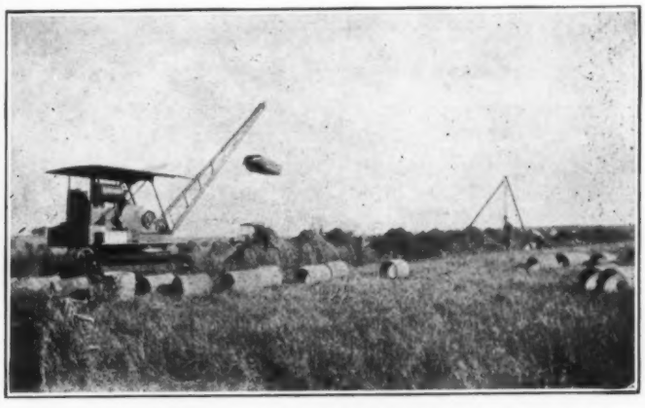
THE SPEEDER CRANE

The Speeder Machinery Corporation of Fairfield, Ia., has brought out a new crane to meet the demand for a light utility machine at a reasonable price. The weight of the crane complete on caterpillar mounting is only 18,000 pounds. This light weight and its compactness make this machine adaptable for either caterpillar or truck mounting. On the former the pressure on the track surface is only 5.5 pounds per square inch.

The Speeder is provided with two speeds on the drums as well as the traction, giving abundance of power for the most adverse conditions. There are three main drums and a boom hoist drum, which may be controlled independently, or the holding drum may be controlled automatically in connection with the hoist drum for clamshell work. This number of drums permits using the crane as a dragline. A large diameter turntable is used to reduce the rocking found with this type of crane. The Hercules Model O Motor is used for power.



HOLT NEW FIVE-TON "CATERPILLAR" TRACTOR.



SPEEDER CRANE HANDLING LARGE PIPE.

AULT TRAFFIC LINE MARKER.

TRAFFIC LINE MARKER

The Tennessee Tool Works, Inc., of Knoxville, Tenn., exhibited at the Good Roads Show the Ault Traffic Line Marking Machine which, it claims, "paints as fast as a man walks," doing the work of ten to fifteen men using hand brushes and reducing paint consumption one-fourth to one-third. It is said to paint a uniform traffic line at the rate of 200 to 300 lineal feet per minute on brick, asphalt, concrete, granite block or any other type of pavement. The paint is applied by spraying and the machine will also spray whitewash, disinfectants or other liquids and has been used for painting fire hydrants and other irregular surfaces.

Two tanks are carried on a light truck, a special air storage tank 12x36 inches having a working pressure of 100 pounds, and a 12x20-inch paint storage tank of welded steel with a working pressure of 50 pounds. The paint tank is balanced on an adjustable trunion to allow paint agitation while operating and is fitted with a 3x4-inch hand hole for cleaning. Two brass screens prevent large particles from reaching the nozzle. Brass valves control the air and paint storage, and there is a quick-closing throttle for paint control at the nozzle operated by a finger trigger on the handlebar of the machine. The paint is carried by a flexible metal, rubber-coated and cotton braided, spraying hose and is discharged through a brass spray nozzle. A special spiral brush constructed of stiff bristles cleans ahead of the spray, while a paint brush of soft bristles spreads the paint to a width of 3 to 8 inches as desired.

The machine occupies a floor space of 26x60 inches, is 48 inches high and weighs 160 pounds. Model B for city traffic lines paints from the side of the machine so that it can reach close to the curb and to cars parked along the street, while Model C for highways paints from the center of the machine.

P. & H. DIESEL EXCAVATOR

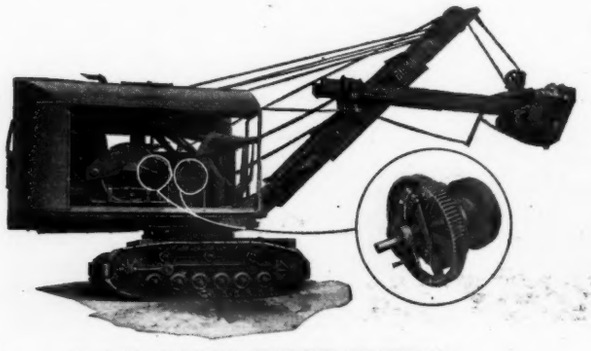
The Pawling and Harnischfeger Company of Milwaukee, Wisconsin, has added a Diesel-driven machine to its line of power-driven excavators.

The Model 208 machine which is shown here, is provided with a 1 cu. yd. struck measure dipper and can also be equipped with 1 cu. yd. dragline or clamshell bucket operating on a 40 ft. boom.

The Diesel-operated machine is a comparatively new development in excavating machinery. It has the advantage of very high thermal efficiency and will burn a cheap grade of fuel oil.

The engine is of the mechanical injection type and is of simple, rugged construction. The crank shaft, wrist pins, bearings, etc., are of extra heavy construction. The speed is very low, reducing vibration to a minimum.

Another new development of the P. & H. excavator is a new clutch control which enables operators to control movements of the excavator with approximately one-tenth of the physical effort previously required. This device is simply a small auxiliary brake with attachments which causes the power of the motor to operate the main drum clutches. When the spur gear is rotating, the drum clutch, clutch operating arm and drum all rotate with it. The auxiliary clutch band is stationary, the dead end being fastened to the machine frame and the other end to the operating lever. When the operator pulls the lever towards him, the auxiliary clutch band is tightened about its drum, retarding the rotation until the clutch rotating arm has been rotated sufficiently to cause the main clutch to grip the drum. The average pull required to operate this control device is about 4½ pounds. There are very few moving parts and these are easily accessible for lubrication and adjustment. The new clutch will be known as the "power clutch control."



P. & H. POWER CLUTCH CONTROL

FLEX-PLANE ROAD JOINTS

The Flexible Road Joint Machine Company, of Cleveland, Ohio, has designed a machine for mechanically installing longitudinal road joints in concrete pavements with perfect alignment, also transverse joints, the joint differing from the ordinary construction not only in that it is machine made, but also in the joint itself.

The peculiar feature of the joint is that it extends only about one-third or half-way through the pavement from the top. The bottom half of the joint forms itself by the contraction of the pavement but naturally with a very irregular break, the two sides of which so fit together that there is no possibility of one side of the joint rising higher than the other. The manufacturers state that this will reduce very materially, if not practically eliminate, the detrimental road impact which the Federal Bureau of Public Roads states is due, in a majority of cases, to high transverse joints.

The joint is made by means of a machine which spans the pavement and follows immediately behind the finishing machine or screed. This machine carries a long and narrow steel plate bent double which is forced into the concrete by combined pressure and vibration produced by the machine, following which a V-shaped expanding bar is forced between the two halves of the plate. After the concrete has taken its initial set, the bar is removed, when the two halves of the division plate can be brought together and the plate withdrawn from

(Continued on page 58)

P. & H. DIESEL DRIVEN EXCAVATOR.

INDUSTRIAL NOTES

SWEET'S STEEL COMPANY

This company, whose office is at Williamsport, Pa., exhibited at the Good Roads Show specimens of rails, ties and track, but the most striking feature was an inclined railroad about 15 feet long upon which moved up and down a globe about 36 inches diameter which at the same time revolved around its own axis; the idea being to illustrate the company's slogan or trademark that "the industrial world rolls on Sweet's track materials." The exhibit was in charge of A. A. Prausnitz, the company's district sales manager.

EISEMAN MAGNETOS

The Eiseman Magneto Corporation of New York displayed at the American Roadbuilders Exposition high tension magneto for 1-cylinder, 2, 4 and 6-cylinder engines; also impulse starters, switches and accessories.

ROBERT BOSCH MAGNETO COMPANY

This, the original Bosch Magneto Company of Chicago, exhibited at the Road Show its different types of starting and lighting switches, head lamps, spot lights, hydrometers and horns; also a fitting whereby a magneto can be installed on the Fordson tractor and another for the Ford car or truck. In connection with the Fordson there is a governor, not of the gas control type but electric, regulating the speed of the motor through the ignition.

The company has just added to its line of spark plugs two new types, one known as the "R. D. Plug," which is of special heavy construction and design, made especially for hard and heavy duty; the other the Super-Ford Plug, designed especially for use in Ford motors.

STEWART MANUFACTURING COMPANY

The Stewart Manufacturing Company of Waterloo, Ia., announces the appointment of A. G. Agnew to the position of treasurer of the company, effective January 1, 1925. Mr. Agnew was formerly vice-president of the Waterloo Bank and Trust Company.

THE OSGOOD COMPANY

This company announces the appointment of C. J. Thompson as district sales manager in charge of the New York district, with offices at 50 Church Street, New York City.

PAVING BRICK PRODUCTION

The National Paving Brick Manufacturers Association reported for November increases in production and stock on hand and slight decreases in shipments and unfilled orders, based on reports from twenty-two companies representing 61% of the normal tonnage capacity of the industry.

The production for November was 27,078,000 as compared with 26,294,000 for October. Shipments declined from 29,142,000 in October to 22,833,000 in November. Unfilled orders the last day of November stood at 68,673,000 as compared with 88,638,000 the last day of October. Ohio led all other states in distribution with close to 8½ million brick shipped during the month for city streets and county highways. Kansas was second, with Texas, Illinois and Pennsylvania following in the order named.

NEIGHBORS

When Ephraim Crosby made a clearing far out on Valley Road and built his house, he had no neighbors. He lived an independent life, producing on the farm practically all that his family ate and wore. Emergencies—sickness and fire and protection of his homestead from prowlers—he met for himself. Later he had neighbors, one five and another eight miles away. Sometimes he helped them with their planting and harvesting, and they helped him in turn. Produce was marketed in the town, twenty miles along the cart-road.

Today Ephraim Crosby's grandchildren still live in the homestead, farming its many acres. The next house is a good mile away. But the Crosbys of today are not isolated. They neighbor with a nation. They buy and sell in the far city as well as in the county-seat. They have at their call the assistance and services of men in Chicago or New York, as well as men on the next farm.

Stretching from the Crosbys' farm living-room are telephone wires that lead to every part of the nation. Though they live in the distant countryside, the Crosbys enjoy the benefits of national telephone service as wholly as does the city dweller. The plan and organization of the Bell System has extended the facilities of the telephone to all types of people. By producing a telephone service superior to any in the world at a cost within the reach of all to pay, the Bell System has made America a nation of neighbors.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES
BELL SYSTEM
One Policy, One System, Universal Service

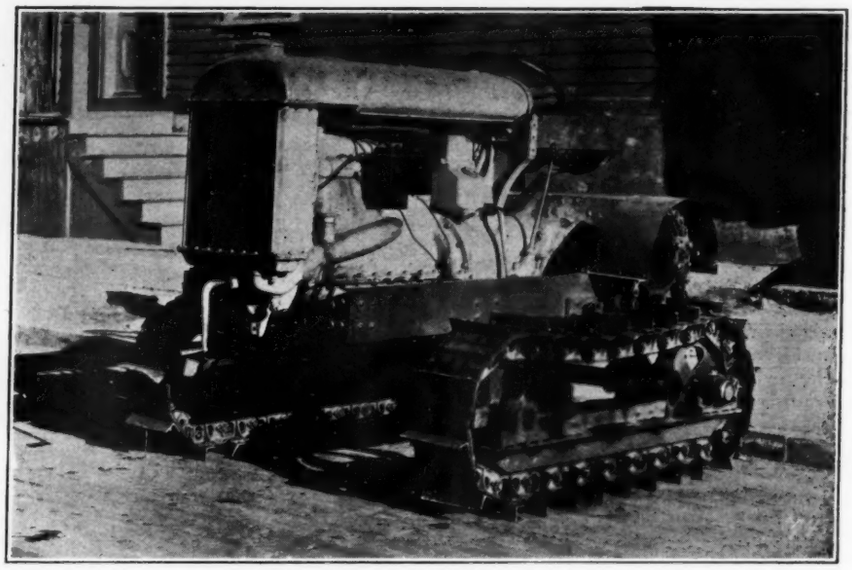
AMERICAN CREOSOTE WORKS

Stanley H. Rose, for eight and a half years foreign sales manager of the Barber Asphalt Company, became associated January 1st with the American Creosote Works of New Orleans as Eastern sales manager of its Creosote Oil Department. Mr. Rose will also act as general sales agent for the Savannah Creosoting Company for creosoted lumber, poles, etc. After February 1st his headquarters will be at the office of the American Creosote Works at Annapolis, Md.

(Continued from page 56)

the concrete without difficulty. The center joint is then finished by a tool especially designed for the purpose. This groove is later filled with a suitable filler which serves also as a traffic line as well as a construction joint. This type of joint was constructed on a road near Smyrna, Delaware, in 1923 and again near the same city in 1924; and a test section was instaled by the Pennsylvania Highway Department near Johnstown, Pa. The same method of construction is used also for transverse joints.

A modification of this machine is used for making central traffic lines of any desired width from 2 to 5 inches and of white or black concrete, brick or other material. For this purpose there are suspended from the machine two steel cutter blades 12 feet long, the space between them being set at the width desired for the traffic line. They are forced into the fresh concrete about a quarter of an inch and the concrete between them is routed out very roughly and quickly without disturbing the concrete outside of the traffic line. The channel so formed, which varies from ¼-inch to 1-inch in depth, is then filled with concrete of the desired color. For a white traffic line the mixture recommended is one part white Portland cement, 1½ parts of white coarse sand and three parts of gravel or crushed stone of ½-inch to ¾-inch screen. This is placed between the cutter blades and struck off flush with the road surface and then, with a specially designed tool which fits neatly between the cutter blades, is given an oval surface. The cutter blades are then raised above the road surface, the machine is moved forward 12 feet and the operation repeated. Instead of a colored concrete line, the channel can be routed out of sufficient depth and brick laid in the channel so formed, the bricks being tamped down to the proper elevation.



HAISS FORDSON TRACTOR.

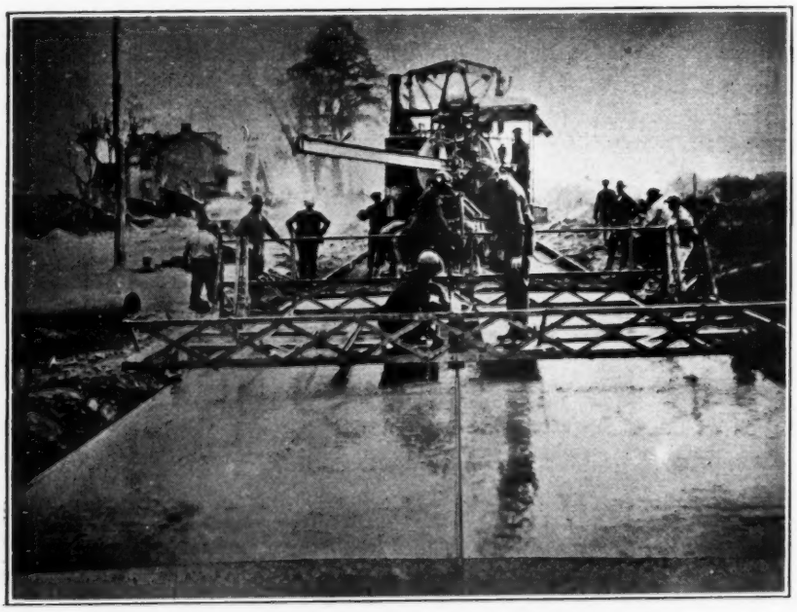
HAISS FORDSON TRACTOR

The George Haiss Manufacturing Company, Inc., of New York City, furnishes a tractor track which can be applied to a Fordson tractor by dismounting the four wheels and front axle, thus adapting the machine for going over uneven ground and pulling heavy loads. Each track contains thirty-one special electric steel shoes annealed for maximum life. Track links have heavy double rail cast integral with track shoe, height of rail being 3⅞ inches and width 1 inch. The track link is 10 inches wide with flat ground contact surface, which surface is made continuous by overlapping of the links. Open sides of track links enable drive sprocket wedge-shaped teeth to eject any accumulation of mud, ice, etc. Chrome nickel steel track pins are used in the links and firmly held by cotter pins in each side.

The truck roller frames are made of heavy steel angles and channels with roof, the shape and reinforcement of the frame being designed for maximum strength. Rear suspension is provided by means of a large steel shaft extending the entire width of the tractor on which the roller truck frames are pivoted by means of a supporting steel bracket. The front end of the tractor is supported by a crossbar which pivots at the center on a longitudinal pin and gives three-point suspension and flexibility. The machine is steered by brakes adjacent to sprockets on jack shaft and differential, which slow down or stop either side of the creeper and permit the opposite track to carry the machine around.

There are three speeds forward, .8 mile an hour, 1.47 miles and 3.63 miles, and one speed reverse, 1.41 miles. The tractor exerts 15 horsepower on the drawbar, which is 1 ft. 9 in. from the ground. The length of the tractor over all is 8 ft., width 6 ft., height 4 ft. 10 in., length of track bearing 4 ft. 6 in. and tread of track 5 ft. 10 in. The weight is approximately 4,600 pounds.

In order to install this on a Fordson tractor, the front axle and the two rear wheels are removed and the tractor is placed on the channel frame, which it is said can be done by two men in about two hours.



MAKING A "FLEX-PLANE" LONGITUDINAL JOINT.

IROQUOIS ASPHALT PUMP.

The Barber Asphalt Company of Philadelphia has placed on the market a new asphalt pump known as the "Iroquois Steam Jacketed Pump," the chief claims which it makes for this pump being: (1) A minimum number of wearing parts in contact with asphalt; (2) Large wearing surface to reduce wear; (3) Large, Straight passages for asphalt instead of the narrow, crooked passages usually present in pumps; (4) Simplicity of construction to insure low cost of maintenance; (5) Ease of operation with minimum of attendants; (6) Steam jackets covering all moving parts and packing so that pump can be started or stopped at will without cleaning out;

(Continued on page 60)

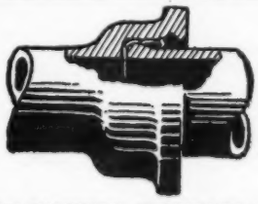
Use it over and over again

THE top photograph shows the removal of twelve-inch Cast Iron Pipe from Olive Street Road, St. Louis, Missouri, on October 11, 1921. This pipe had been in service in this location since 1902—nineteen years—and was in perfect condition. The lower photograph shows the same pipe being hauled to a new location where it was relaid. Cast iron pipe lasts for centuries, protected by its self-forming film of oxide. The ease with which it can be taken up and relaid is another of the many advantages of Cast Iron Pipe.

THE CAST IRON PIPE PUBLICITY BUREAU, Peoples Gas Building, Chicago

CAST IRON PIPE

THE BELL & SPIGOT JOINT



THE ACCEPTED STANDARD FOR UNDERGROUND CONSTRUCTION

Our new booklet, "Planning a Waterworks System," which covers the problem of water for the small town, will be sent on request

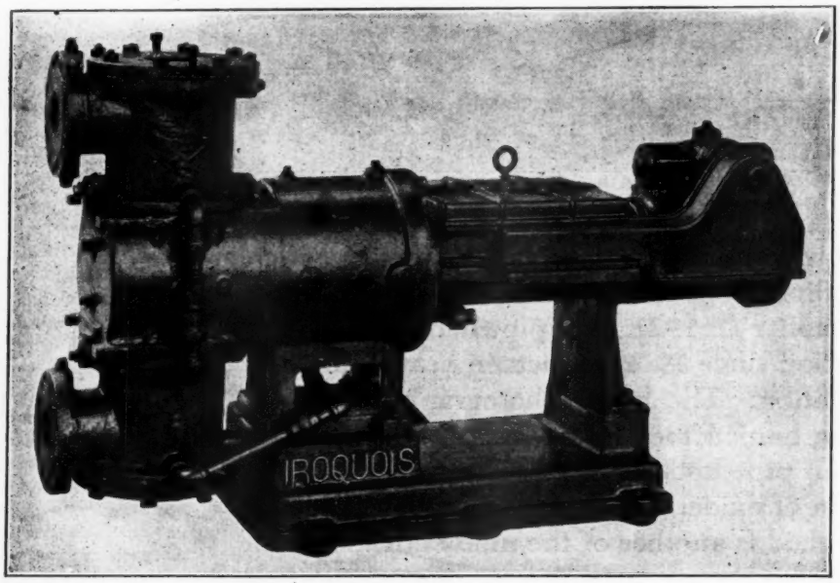
Send for booklet, "Cast Iron Pipe for Industrial Service," showing interesting installations to meet special problems

(Continued from page 58)

(7) Absence of springs or other small, easily broken parts in the valve chambers; this because pieces of barrel staves or metal drums, stones, sand and other foreign matter sometimes get into the asphalt.

The pump is of the reciprocating single-acting plunger type, which permits extreme simplicity of construction. The ball type of valve was adopted because it obviated the necessity of springs in the valve chamber, provided the maximum possible amount of wearing surface, permitted large straight passages for asphalt and the passage of large pieces of foreign matter, and reduced the number of wearing parts in the valve chamber to a minimum.

Steam jackets cover all parts of the asphalt end, including valves, plunger and plunger packing. With steam in the jackets, the pump can be stopped for an indefinite period without having to blow out or otherwise having to remove asphalt in the pump chamber. Should it solidify in the chamber, the asphalt can be rendered liquid by introducing steam into the jacket.

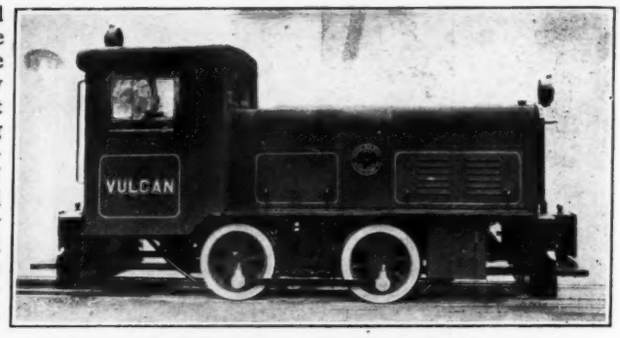


IROQUOIS ASPHALT PUMP.

The pumps are furnished in three standard sizes with rated capacities of 50 gallons, 100 gallons and 200 gallons per minute. The steam cylinders are of close grained iron, the piston rod of steel, the plunger of close grained gray iron, the hollow ball valves of bronze, the valve seats and cages of cast-iron, and all steam jacketed parts of special cast-iron tested with 250 pounds hydraulic and 170 pounds steam pressure in the jackets.

VULCAN GASOLINE LOCOMOTIVE

The Vulcan Iron Works of Wilkes-Barre, Pa., had on exhibition at the Chicago Good Roads Show one of their latest 7-ton worm gear drive, gasoline locomotives. The transmission of this locomotive is of the 4-speed, selective gear type, the gears being of the constant mesh jaw type wherein the gears are always in mesh and speed changes are made through the engagement of jaw clutches and not through the clashing of gears, thus eliminating the chance of stripping gears and making possible easier and quicker speed changes without loss of acceleration or motion by the locomotive and load.



VULCAN GASOLINE LOCOMOTIVE.

The 7-ton special is equipped with a 60-horsepower Waukesha engine. The radiator is of the tubular type, well protected. The cab is locomotive type, fully enclosed. The frames are cast steel, open bar type, with bumpers of heavy section cast-iron.

SPRINGFIELD MOTOR SWEEPERS.

The Kinney Manufacturing Company of Boston, Mass., has recently taken over the Springfield Motor Sweeper, formerly manufactured by the Springfield Motor Sweeper Company. This is a pickup sweeper which carries five brooms, two vertical rotary brooms forward, which sweep dirt inward from both sides toward the center of the machine, covering a space 9 feet wide and placing the material in a windrow 6 feet wide, behind which two other vertical brooms narrow the windrow to approximately 3 feet. The fifth is a horizontal pickup broom which throws the sweepings from this window on to the elevator, which conveys them to a storage bin carried on the rear of the machine. The forward brooms not only serve as gutter brooms, but by narrowing the window permit a 4-foot pickup broom to serve the 9-foot strip. The material is thrown forcibly from the elevator into the hopper by the rotary discharge, packing the hopper so tightly that a much greater weight of material is carried per cubic foot than in a gravity-filled container. It is claimed that the vertical rotary brushes clean out cracks and crevices in the pavement, as in stone or other rough streets, much more effectively than the ordinary horizontal revolving broom. The brooms use steel brushes, which last much longer than splint brushes.

The storage hopper is of the gravity operated roll-over dump type and is dumped by the driver by releasing a catch. The point of discharge from the hopper is 7 feet from the rear wheels, thus permitting the load to be dropped over the edge of a fill.

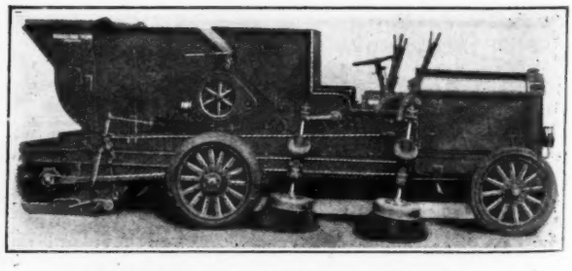
The rotary disc brushes are made in four segments which are bolted into pressed steel cups so that new segments are easily installed when a brush is worn out. The horizontal pickup brush is of practically the same construction, being made of tempered steel bristles in four wooden segments which are fastened to the shaft by clamps.

ASPHALT PATCHING PLANT

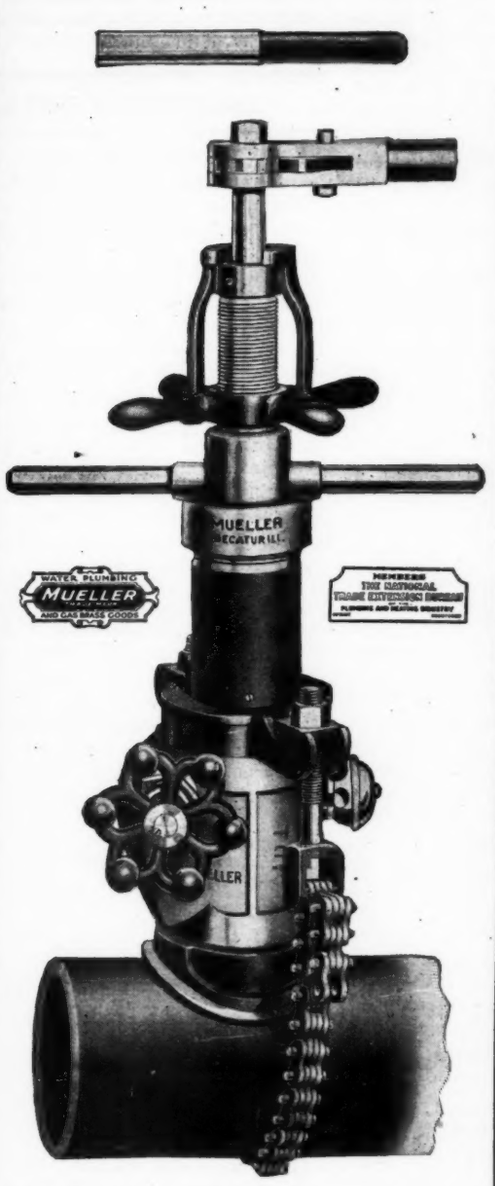
The East Iron & Machine Company of Lima, Ohio has applied for patents on a one-unit asphalt patching plant which it calls the "Mosher Patching Plant." The aim is to provide a plant that will offer a convenient appliance and method for patching or repairing with asphalt a pavement, whether asphalt, concrete or brick; and one of sufficient capacity to complete economically small jobs of new asphalt pavement, such as street extensions and alleys, with a minimum of labor.

When used for laying new pavement the capacity of this plant is from 600

(Continued on page 62)



SPRINGFIELD PICK-UP SWEEPER.



MUELLER No. "A" Water Tapping Machine

is designed for tapping water mains and inserting corporation cocks under pressure, from 1" to 2" in size. The "A" Machine embodies the latest improvements and represents the most approved practice in both construction and operation.

Increased Dividends for You

The sure way for Public Service Companies to increase dividends is to reduce operating costs. You can materially reduce your tapping costs by using Mueller Tapping Machines and Tools—because they embody the results of over sixty years of practical experience.

MUELLER Tapping Machine No. "A"

will tap water mains and insert corporation stops from 1" to 2" in size, in pipe under pressure. Other models of Mueller Tapping Machines specially designed for different conditions. More than 90% of all tapping machines in use today are Mueller-made. Write for complete descriptions and prices.

Mueller Co.
Decatur, Ill., U. S. A.

145-149 W. 30th St., New York; 1072 76 Howard St., San Francisco; 2468 Hunter St., Los Angeles

(*Continued from page 60*)

to 800 square yards of 2-inch-surface, or 700 to 900 square yards of binder, in a 10-hour day under normal conditions; and even more if the conditions are favorable.

It is a complete, self-contained, one-unit plant mounted on a trailer. The plant is 96 inches wide out-to-out of hubs, 18 feet 2½ inches long and 13 feet 11 inches high from street level to extreme top. The upper portions of the hot elevator are bolted on and can be removed easily for shipping by rail.

The trailer is a 4-wheel, heavy-duty type with turntable under the front end. It is flexible in backing up and has a simple and positive connection to the truck. The frame is of 7-inch channels, is 61 inches wide and 17 feet 7½ inches long, mounted on four 36-inch wheels with solid rubber tires.

The main plant frame is built of 6-inch channels to which are riveted heavy vertical channels and the whole is securely riveted to the trailer frame. Heavy gusset plates at all connections make the frame strong and rigid.

A drum feed elevator of 6 x 4 malleable iron buckets will deliver approximately 7 tons per hour. This and all the operating parts are driven from a line shaft extending the length of the plant.

The drying drum is one of this company's special patent, 30 inches diameter and 8 feet 6 inches long. Inside are four I-beams acting as spill plates, and spiral flights to carry the material forward. The drum is heated by means of a fuel oil furnace in the feed end of the drum. The capacity of the drum when handling materials containing approximately 5 per cent. moisture is about 7 tons per hour. The drum is completely enclosed by steel plates which permit sufficient warmth to radiate to aid in maintaining the temperature of the asphalt in the kettle above.

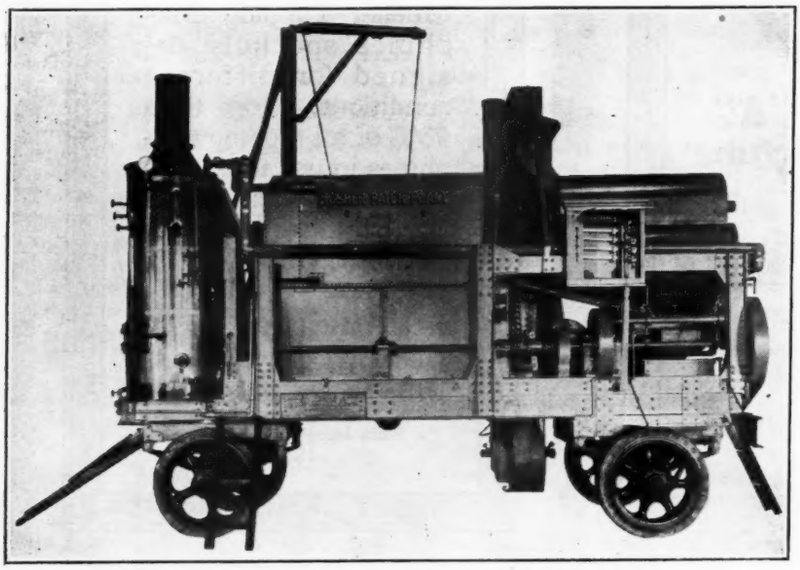
The melting kettle is set closely over the drum. The whole top may be unbolted and removed when necessary to clean the kettle. It has a capacity of 500 gallons when filled to within 4 inches of the top. It is equipped with a steam coil connected on the outside of the kettle. There are no joints inside the kettle to become loose and leaky. The heated asphalt is carried from the end of the kettle to the mixer platform through pipe and fittings that are steam-jacketed.

The dry, hot aggregate is discharged from the drying drum into the boot of the hot material elevator, which has the same capacity as the cold material elevator. From the hot elevator the aggregate passes through a revolving cylindrical screen which discharges it into the storage bin. It is enclosed with a sheet steel housing to confine the dust and heat. The storage bin has three compartments, each with a gate for drawing off material into the weigh box. The bin holds approximately 2 tons. The weigh box is supported on a scale having four weighing beams and one tare beam and has sufficient capacity for one mixer batch. An asphalt weigh bucket is suspended from the aggregate weigh box over the mixer and is filled by means of a quick opening valve in the asphalt line. One beam of the scale is used for weighing this asphalt.

The mixer will mix a 300-pound batch in about one minute. It is driven at 85 to 90 r. p. m. It is pug mill type with cast-iron frame and steel bottom in which two steel shafts carry mixer blades rotating toward the center. The material is dumped through the bottom of the mixer directly into trucks by means of gates operated by levers on the mixer platform.

Power is furnished by a 10-horsepower horizontal steam engine which drives the main line shaft. The boiler is of the vertical type and is equipped with a high-class fuel oil burner. The fuel oil, before being burned can be heated in the kettle, one end of which is divided by a partition giving a compartment of 100 gallons capacity.

In general, no packing, unpacking or setting up of the plant is necessary, the only dismantling of any kind that is required being the removing of the head shaft of the hot material elevator when the plant is to be shipped by rail.



MOSHER ONE-UNIT ASPHALT PATCHING PLANT.

INDUSTRIAL NOTES

(*Continued from page 57*)

MERRIMAN ASPHALT PLANT

Beginning immediately, all Merriman asphalt plants will have as a regular equipment a 1-ton batch mixer driven by a 40-horsepower engine instead of the 1,500-pound batch mixer driven by a 30-horsepower engine, which was the former installation. This will increase the tonnage of the plant about 30% but the selling price will remain the same.

The East Iron and Machinery Company of Lima, Ohio, manufacturers of this plant, exhibited a small model of this plant at the Good Roads Show; also the new Mosher patch plant with a capacity of 700 yards, mounted completely on a rubber-tired trailer.

ASPHALT PRODUCTS AGENCY

J. R. Draney announces that he is prepared to offer to the paving industry asphalt and allied products, including "Bitoslag," "Kolmend" and "Surfacrete." Mr. Draney's office for marketing these products will be at 90 West St., New York City.

ELECTRIC WELDING

The General Electric Company of Schenectady, N. Y., has published a 120-page volume bound in cloth entitled, "Arc Welding and Cutting Manual," which it has issued "to acquaint the uninformed in a general way with some of the applications of arc welding and to provide a simple and logical method by which one may acquire a certain familiarity with the manipulation of the electric welding arc and its charatceristics." The volume is profusely illustrated with photographs, diagrams and charts explanatory of the text.

KLYCE AND HARRUB

B. H. Klyce, C. N. Harrub and William E. Wilbur announce their association under the firm name of Klyce and Harrub. Mr. Klyce will give special attention to municipal, highway, structural and drainage engineering, Mr. Harrub to sewerage and waterworks and Mr. Wilbur to reinforced concrete and steel. The office will remain at 506-9 Fourth & First National Bank Building, Nashville, Tenn.

WARREN BROTHERS COMPANY

The Pacific northwest branch office of Warren Brothers Company removed last December to 411-417 Yeon Building, Portland, Ore.

NEWS OF THE SOCIETIES

Feb. 24-27—AMERICAN CONCRETE INSTITUTE. Annual meeting at Chicago, Ill.

Feb. 25-27—NORTHEAST BRANCH, ASSOCIATED GENERAL CONTRACTORS Annual convention at St. Paul, Minn.

April 20-25—NATIONAL CONFERENCE ON CITY PLANNING. International conference at New York City.

April 22-24—AMERICAN SOCIETY OF CIVIL ENGINEERS. Spring meeting at Cincinnati, O.

April 27-May 1—AMERICAN WATER WORKS ASSOCIATION. Annual convention at Brown Hotel, Louisville, Ky. Secretary, Wm. Niesley, 170 Broadway, New York.

June 2-5—AMERICAN ASSOCIATION OF ENGINEERS. Annual convention at Orlando, Fla.

June 22-26—AMERICAN SOCIETY FOR TESTING MATERIALS. Annual meeting at Atlantic City, N. J.

Sept. 7-12—NEW ENGLAND WATER WORKS ASSOCIATION. Annual convention on board steamer on St. Lawrence River.

AMERICAN SOCIETY OF CIVIL ENGINEERS

The 77th annual convention of the American Society of Civil Engineers was held in New York, January 21st to 23rd. The morning of the 21st was occupied with the report of officials, the conferring of honorary membership on Secretary Hoover, the presentation of medals, prizes and the report on the ballot for officers. The treasurer reported book assets of $1,350,435 with a surplus of $990,693. Additional student chapters were added at the University of Georgia and Armour Institute and a local section for the state of Arizona. The Board expressed its favor of a model registration law that it had adopted, and of stimulating commercial flying and the air mail service, and reaffirmed its approval of a Federal department of public works.

The Norman medal was awarded to D. F. Jakobsen for his paper on "Stresses in Multiple-Arch Dams"; the James J. R. Croes medal to Joel D. Justin for his paper on "The Design of Earth Dams"; the James Laurie prize to C. M. Allen and I. A. Winter for their paper entitled, "Comparative Tests on Experimental Draft Tubes," and the Arthur M. Wellington prize to Rufus W. Putnam for his paper on "Modern Rail and Water Terminals with Reference to Chicago." No awards were made of the Thomas Fitch Rowland prize or the Collingwood prize for juniors.

On Thursday night there was a smoker and a skit by the New York section. On Friday an excursion to West Point and Bear Mountain was attended by about 375.

The tellers reported that the following had been elected: As president, Robert Ridgeway; vice-presidents for two years, Milo S. Ketchum and Richard L. Humphrey; as directors for three years, Willard Chevalier, Charles Gilman, Paul Norcross, Albert R. Raymer, C. M. Spofford and H. D. Dewell.

On Wednesday afternoon reports of special committees were presented and discussed, including those on "Impact on Highway Bridges," "Concrete and Reinforced Concrete Arches," "Flood Protection Data," "Hydraulic Phenomena" and others.

The technical discussions of Thursday were held by divisions, those of special interest to public works officials being the highway division, sanitary engineering division and city planning division. In the highway division Prof. A. M. Johnson read a paper on "Development of Highway Traffic," which was discussed by W. H. Connell, T. R. Agg and A. W. Dean. Prof. W. K. Hatt read a paper entitled, "The Effect of Moisture on Concrete," giving results of tests on movement of concrete and its strength as effected by moisture.

The discussions by the Sanitary Division were confined to the matter of odors, the laws relating to obnoxious odors being discussed by Irving I. Goldsmith and Joseph A. Warren; "Methods of Determining Source and Extent of Obnoxious Odors" by Stephen DeM. Gage and C. A. Holmquist, George H. Shaw and L. L. Tribus; "Elimination of Odors from Garbage Disposal Plants," by Samuel L. Greeley, John D. Lewis and I. S. Osborn. John F. Skinner and Morris Cohen discussed "Control of Odors from Sewage Treatment Plants," while Robert Spurr Weston presented an abstract of a lengthy paper on "The Detection and Elimination of Odors from Oil Refineries."

In the city planning division Allen J. Saville read a paper entitled "The Scope of City Planning," which was discussed by J. C. Carpenter, W. W. Horner, Capt. George H. Norton and others. Frank B. Williams presented "The Present Status of Excess Condemnation in the United States," and Frederick H. Fay discussed "Excess Condemnation in Massachusetts"; while "The Use of Excess Condemnation in the Opening, Widening and Extension of Streets" was the subject of a paper of Arthur L. Vedder. Finally "The Need and Scope of Excess Condemnation" was presented by Charles W. Leavitt and discussed by Horace H. Sears and Frank O. Whitney.

NORTHEASTERN SECTION, A. S. C. E.

This section, at its annual meeting on January 31, elected as officers Charles L. Hammond, president; Edward H. Cameron, vice-president; Charles W. Banks, secretary-treasurer. An address discussing the need of investigations of the possibilities of power and navigation development of rivers and flood control was given by O. C. Merrill.

ILLINOIS SECTION, A. S. C. E.

This section on December 18th elected for the following year, as president, Charles B. Ball, and as vice-president, D. J. Brumley, and re-elected as vice-president, T. L. D. Hadwen, and as secretary-treasurer, W. D. Gerver.

ILLINOIS SOCIETY OF ENGINEERS

The fortieth annual meeting of this society was held at Chicago on January 14th to 16th. Each of the six sessions was devoted to a particular class of work and abundant time allowed for and occupied with discussion of the papers read. More than 200 members registered. Among the subjects discussed were: "The Relative Value of Combined and Separate Sewers"; "The Operation of Sewage Treatment Works"; "The Effect of Temperature and Alum on Hot Process Water Softening"; "The Illinois Surveyors Licensing Law"; "The Use of High Pressure Steam and of Powdered Fuel"; "The Illinois State Highway Laboratory"; "Concrete and Brick Paving"; "Oiling Earth Roads," and several others. The officers elected for the coming year are: As president, A. L. Webster; vice-president, J. J. Woltmann, and as secretary, H. E. Babbitt.

AMERICAN WATERWORKS ASSOCIATION

The forty-fifth annual convention will be held during the week of April 27th at Louisville, Ky., with headquarters at the Brown Hotel. The nominating committee announces the following nominees for the coming year: President, Harry F. Huy; vice-president, George W. Batchelder; treasurer, William W. Brush; trustee, District No. 1, R. L. Dobbin; trustee, District No. 2, Patrick Gear; trustee, District No. 6, George H. Fenkell.

NEW YORK SECTION, AMERICAN WATERWORKS ASSOCIATION

This section on January 22nd held a luncheon in New York City jointly with the Sanitary Section of the American Society of Civil Engineers, at which the principal speaker was Albert L. Webster. He discussed the report of the Committee on Plumbing of the Building Code Committee, appointed by Secretary Hoover, prefacing his paper with a eulogy of the work accomplished by Professor George C. Whipple, who had died a few days previous, and who was to have given this address in place of Mr. Webster. The waterworks engineer, he said, is interested in the plumbing of buildings chiefly, perhaps, because of the waste of water that would be caused by improper plumbing, referring to the fact that a building as large as the Equitable Building would require as much water as a community of 5,000 or more people. The paper was discussed by A. E. Hansen and William W. Brush. The New York Section then directed the Board of Governors to prepare a set of resolutions on the death of John M. Diven.

NEW ENGLAND WATERWORKS ASSOCIATION

At the meeting of this association in Boston on January 13th, with 143 registered attendants, Frank N. Speller read a paper on "Corrosion," illustrating it with a number of lantern slides. He explained the theory of corrosion of pipes due to oxygen and moisture and affected by temperature and velocity. The subject of protective coating was discussed and the effects of both chemical corrosion and electrolysis. The subject was further discussed by William A. Mackenzie, A. O. Doane, Robert Spurr Weston and Prof. George E. Russell.

"Progress and Experiences of Forestation of Watersheds—Some Costs, Figures and Description of Methods" was the title of a paper by Theodore L. Bristol, in which he told of work done by the Ansonia Water Company of which he is president. This company has planted over 200,000 white pine and red pine seedlings, about 1,200 trees per acre being set out at a cost of $20 per acre for planting. This paper was discussed by Edward E. Minor, Harold O. Cook, George A. King, and a number of others. Mr. Cook described the results of comparing two streams, one stripped of timber and the other left wooded, snow having been found to remain on the ground six weeks later on that on which the trees had been left, while five times as much sediment was carried by the stream draining the area that was stripped.

President Stephen H. Taylor announced that the next convention would be held on board a steamer during five or six days in September, the steamer meantime making a trip on the St. Lawrence River.

ASSOCIATION OF HIGHWAY OFFICIALS OF NORTH ATLANTIC STATES

A new organization with the above title has recently been formed, representatives of the states of Maine, New Hampshire, Connecticut, New York, New Jersey and Delaware having already joined. The first annual convention is to be held on February 25th to 27th at the Chalfonte-Haddon Hall, Atlantic City, N. J. The idea is to form an association of highway officials confined to a more or less limited area where the highway problems are more nearly the same throughout than is the case with the national organization, where many of the discussions are not pertinent to the conditions encountered by many of those present.

A constitution has been tentatively adopted providing for four grades of members; states, members, associate members and associates. At the organization meeting the following officers and directors were elected: Directors—Maine, Paul D. Sargent; New Hampshire, William A. Grover; Connecticut, John A. Macdonald; New York, Arthur A. Brandt; New Jersey, William G. Sloan; Delaware, C. D. Buck. The officers elected were: President, William G. Sloan; vice-president, Paul D. Sargent; secretary and treasurer, A. Lee Grover.

KANSAS-MISSOURI CONTRACTORS ASSOCIATION

This association, consisting of fifty-three general contractors doing public works construction, at its meeting on January 16th, elected as officers: President, W. G. Dickie; vice-president, A. L. Cook; treasurer, E. W. Geiger, and secretary, Clark Mandigo.

(*Continued on page 50*)

PERSONALS

MacGregor, Robert A., formerly assistant engineer in the Bureau of Engineering of Manhattan Borough, New York City, has been appointed Engineer of Maintenance of that borough, in charge of maintenance of pavements and sewers.

Symonds, Edward F., for many years town engineer of Franklin Township, now Nutley, N. J., died January 31, in his 82nd year.

Smith, Winston H., has resigned his position of assistant state highway engineer of New Mexico.

Cooper, R. L., formerly district highway engineer for the Albuquerque district, New Mexico, has succeeded W. H. Smith as assistant state highway engineer of that state.

Thomas, C. M., formerly sewer and water engineer for the Long-Bell Lumber Co., has been appointed city engineer of Kelso, Wash.

Thompson, V. Avery, has resigned his position as city manager of Phoenix, Ariz., and on February 1 joined the contracting firm of Claude Fisher, of Los Angeles.

Todd, E. N., formerly engineer of construction for the Kentucky Highway Department, has been appointed state highway engineer of that state.

Kent, Willard, secretary of the New England Water Works Association from 1899 to 1920, died recently, aged 73 years.

Bingham, C. A., formerly city manager of Lima, O., has been appointed city manager of West Palm Beach, Fla.

U. S. CIVIL SERVICE EXAMINATIONS

Junior Patent Examiner. Examinations April 22nd and 23rd. To fill vacancies in Patent Office. Entrance salary, $1,860 a year. To perform elementary scientific or technical work in examination of applications for patents, to see what alleged inventor thinks he has produced that is new and to see that disclosure is complete, to investigate the prior art as represented by patents already granted in the United States and various foreign countries and by descriptions in technical literature.

Senior Land Appraisal Aid, Assistant Land Appraiser, Associate Land Appraiser and Land Appraiser. Applications received until March 10th. To fill vacancies in the Interstate Commerce Commission. Entrance salary, $1,860, $2,400, $3,000 and $3,800, respectively, for positions named. Senior Land Appraisal Aid duties to consist of assignment to tax and deed record search on properties of minor importance, plotting of tax and sales information or data of similar character on maps, computation of areas, unit prices, etc., from maps and simple verification of titles on properties of minor importance. Assistant Land Appraiser duties to consist in search of tax and deed records, plotting of tax and sales information and similar data on maps, verification of titles, verification in field of appraisel data and appraisal of lands of minor importance. Associate land appraiser duties consist in appraisal of urban and rural lands, interview local authorities, real estate men and parties to land transactions in field, testify in support of such appraisals for the Commission or courts, prepare rebuttal appraisals and conduct conferences for adjustment of appraisals of minor importance. Land Appraiser duties consist in interviewing executive officers of financial institutions and large corporations, public officials and others on matters relating to appraisal work, appraise important railway terminal lands, supervise and assume responsibility for work of associate land appraisers and other subordinates in terminal appraisals, conduct conferences leading to adjustment of appraisals on carriers of major importance, testify as qualified expert in support of appraisals made and prepare rebuttal appraisals on land of major importance.

Junior Laboratory Mechanic (Instrument Maker)—$1,320 a year; Assistant Laboratory Mechanic (Instrument Maker)—$1,500 a year; Laboratory Mechanic (Instrument Maker)—$1,680 a year, and Senior Laboratory Mechanic (Instrument Maker)—$1,860 a year. Examinations March 10th. To fill vacancies in Bureau of Standards, Department of Commerce. To design, construct and repair scientific and technical instruments and apparatus of high precision.

Assistant Mechanical Engineer (Cryogenic). Examinations March 10th. To fill vacancy in Bureau of Mines, Department of Interior. Entrance salary, $2,100 a year. Duties consist in operation of experimental liquefaction plants, including care and operation of high pressure compressor equipment, calibration of thermocouples and taking data including reading of electric temperature instruments, pressure gauges, manometers and the like.

Assistant Reclamation Economist. Examinations March 11th. To fill vacancies in Reclamation Service, Department of Interior, for field duty. Entrance salary, $1,800 to $3,000 a year. To do field work in study of suitability of arid lands for irrigation, analysis of irrigated farms for costs of production, etc., and assist in economic surveys of irrigation projects.

Resists Corrosion

THIS picture, taken in the salt marshes near Kearney, N. J., shows two lines of 30-inch Cast Iron Pipe replacing pipe made of other material. The alternate exposure to the action of salt water and air is a severe test.

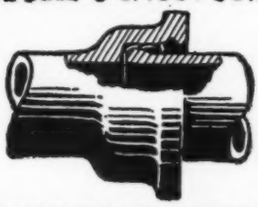
While the pipe shown in the picture is subjected to unusual corrosive influences, all underground pipe must be able to withstand corrosion to a greater or less degree. Cast Iron Pipe has this quality. It does not depend on its coating to resist rust; the material itself is rust-resisting. The first Cast Iron Pipe ever laid is in service today at Versailles, France, after two hundred and sixty years' service.

THE CAST IRON PIPE PUBLICITY BUREAU, Peoples Gas Building, Chicago

CAST IRON PIPE

Our new booklet, "Planning a Waterworks System," which covers the problem of water for the small town, will be sent on request

THE BELL & SPIGOT JOINT



THE ACCEPTED STANDARD FOR UNDERGROUND CONSTRUCTION

Send for booklet, "Cast Iron Pipe for Industrial Service," showing interesting installations to meet special problems

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

A. B. C. TRAFFIC LINE MARKER

The Highway Appliance Company, of Providence, R. I., has placed on the market a machine for marking traffic lines on any kind of hard pavement, using paint for the purpose. The paint flows by gravity from a container and is spread on the pavement by a brush in quantities sufficient to fill the small voids in the surface and thus obtain a real bond with the pavement. The marker is designed for operation by either one or two men; one man for straight-line work such as crosswalks, parking zones, etc., or two men for curved lines where it is necessary for the marker to be carefully guided. It is carried on four wheels, all outside of the stripe, and can therefore be backed over a freshly painted line without marking it. A stripe has been painted at the rate of over 150 feet per minute, but the speed depends on the skill of the operator, the conditions of traffic, nature of street surface, etc.

The machine consists of a small truck upon which is mounted a conical sheet-metal tank holding about 4 gallons, to which is connected a brass pipe terminating in a distributor that discharges a small amount of paint in fine lines on the pavement. Immediately behind the distributor is a brush of the desired width which spreads the paint to an even stripe. The rate of flow of paint is controlled by a valve lever at the operator's right hand. Wings are attached to each side of the brush to insure an even width of line and the brush is kept at uniform pressure against the pavement by a tension spring. Brushes are furnished in three sizes, for 4-inch, 6-inch and 8-inch lines.

MUNIC-A-LIGHT TRAFFIC BEACON

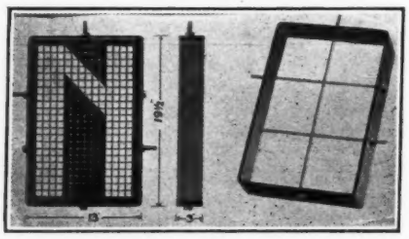
The Municipal Street Sign Company, Inc., of New York City, manufactures what it calls the "Munic-a-Light Traffic Beacon," a flash beacon that can be seen at all angles and which illuminates the base. It is operated by an electromagnet with mercury tube. It is supported by a round iron post with a ⅜ inch wall throughout, which is attached to a heavy concrete base. The reflector for illuminating the base is of malleable iron.

TILE TRAFFIC GUIDES

The Signs of Safety Company, of Chicago, Ill., manufactures tile letters to be set into pavements to act as traffic guides, to which it has given the name S.O.S. Tile Traffic Guides. Each letter is made of tiles ½-inch thick and ¾-inch square, of vitreous material imbedded in 3 inches of concrete and the whole encased in a steel frame 3 inches high reinforced with three transverse steel tie rods bolted through the frame and both preventing spreading of the frame and anchoring the frame in the roadbed. The tiles are said to be non-breakable and resistant to abrasion. The letters are shown in white tile on a background of black tile and thus stand out prominently. They can be installed in either old or new pavement of concrete, asphalt or brick.

CYCLONE ROAD GUARD FENCE

The Cyclone Fence Company, of Waukegan, Ill., during the past year has developed a road guard fench which is made of heavy chain link fence fabric which gives when collided with, acting as a spring. It is made from Cyclone "Galv-after" fence fabric, which is heavily zinc-coated after weaving, the coating being approximately five times as heavy as that applied to ordinary fabric made from commercial wire galvanized before weaving. The galvanizing gives the fence a silvery white finish, which causes it to stand out sharp and clear at night under automobile headlights. Should a wire of the fence become broken, it is easily and quickly renewed in a few minutes by one man. The fence is built of No. 6 gauge wire, and has a standard height of 24 inches for erection of fence 36 inches high, supported by stout wooden posts.



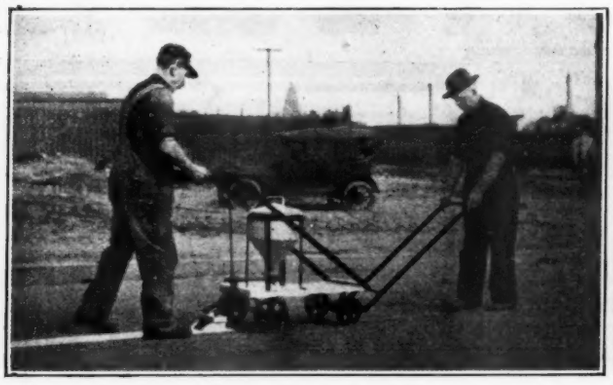
TILE LETTER TO BE SET INTO PAVEMENT.

GUARD RAIL CABLE

The Macwhyte Company, of Kenosha, Wis., manufactures the Macwhyte Guard Rail Cable for highways, bridges, culverts, etc. This cable consists of three strands of seven wires each, heavily galvanized and having a tensile strength of over 15,000 pounds. The diameter is ¾-inch. The company is in a position to furnish fittings for erecting the guard rail in accordance with the specifications of any of the state highway departments.

RUSTLESS STEEL POLES

The Truscon Steel Company of Youngstown, Ohio, a few months ago announced that it had begun manufacturing steel poles for supporting wires and other street service. The company now announces that it has put on the market a steel pole fabricated from copper steel. For several years steel manufacturers have been conducting a series of tests to determine the exact value of copper alloy in steel in producing a rust- resisting material, and the adoption of this material by the Truscon Company is the result of these tests.



THE A. B. C. TRAFFIC LINE MARKER.

CYCLONE ROAD-GUARD FENCE MAKING DANGEROUS MOUNTAIN ROAD CURVE SAFE FOR MOTORISTS.

VITRIFIED CLAY PIPE

The Pipe Everlasting

The Supreme Test of Endurance
proven since thousands of years B. C.

Ancient and Modern Civilizations have agreed in the use of clay products for sanitation

Clay products, after centuries of use and exhaustive test, are today recognized as the one material providing all the qualities necessary to satisfy the exacting demands of sanitary structures.

In the Bismya Temple in Babylon were uncovered a horizontal drain of tiles of vitrified clay—in almost perfect preservation today.

The palace of Knossus (about 1400 B. C.) of the ancient Cretans had a number of well constructed drains of terra cotta pipe in perfect condition.

In the ruins of the Parthenon Tombs have been discovered beautiful clay vases and other ornaments of clay.

VITRIFIED CLAY PIPE resists all corrosion and presents a permanent cleanable surface. It is dense and impervious to a high degree. Sewers built of Vitrified Clay Pipe will last indefinitely.

For permanency use Vitrified Clay Pipe

Water Conduit of Vitrified Clay in Bismya Temple, Babylon, About 250 B. C.

FOR FULL PARTICULARS WRITE

EASTERN CLAY PRODUCTS ASSOCIATION

HENRY T. SHELLEY, Sec. Mgr. Telephone Spruce 5029

906 Colonial Trust Bldg., Philadelphia, Pennsylvania

MEMBERS

The Buckeye Fire Clay Co. Uhrichsville, Ohio
Cambria Clay Products Co. Blackford, Ohio
Crouse Clay Product Co. Akron, Ohio
The Dennison Sewer Pipe Co. Dennison, Ohio
East Ohio Sewer Pipe Co. Irondale, Ohio
Evans Pipe Co. Uhrichsville, Ohio
Junction City Sewer Pipe Co. Junction City, Ohio
Logan Clay Products Co. Logan, Ohio
Patten Clay Mfg. Co. Patton, Pa.
Pennsylvania Clay Products Co. West Winfield, Pa.
Portland Stone Ware Co. 49 Federal St., Boston, Mass.
Robinson & Sons Sewer Pipe Co. Uhrichsville, Ohio
Robinson Clay Product Co. Akron, Ohio
Robinson Clay Product Co. of Penna. Clearfield, Pa.
Romig Clay Products Co. Uhrichsville, Ohio
Ross Clay Products Co. Uhrichsville, Ohio
St. Marys Sewer Pipe Co. St. Marys, Pa.
Wolf-Lanning Clay Co. Dennison, Ohio

TESTED BY FIRE

The Truscon pole consists of two structural steel channels, each of which has the center portion of the web sheared and pressed out normal to the web, each of the pressed out sections forming approximately a triangle. The depths of the cuts are uniformly graded from the top to the bottom so that when the two channels are riveted together, a tapered pole is formed in which the web members form what is practically a double intersection Warren type cantilever truss. Also each web member is curved in the form of a circular arc, thus adding substantially to its ability to resist compressive stresses.

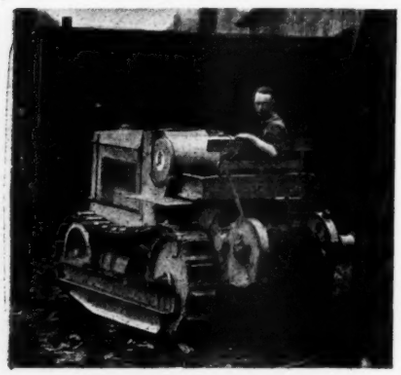
J. T. TRACTOR WINCH

The J. T. Tractor Company, of Cleveland, Ohio, has recently perfected a winch which fits on the rear end of the J. T. Tractor and becomes an integral part of it. It may be used for raising stones out of quarries, handling heavy machinery, raising towers and stringing the wires for transmission lines, lowering sewer pipe into trenches, and practically any similar kind of heavy work.

The winch consists of a drum 9 inches in diameter by 22 inches long which will hold 800 feet of ½-inch cable. The drum is supported by a steel shaft running in bronze bearings located in two heavy steel castings bolted to the rear of the end frame. It is driven through the regular tractor transmission with three speeds for raising and one for lowering, the high speed in raising being 170 feet per minute and the low speed approximately 65 feet, which latter is also the speed in lowering. A nigger head is provided on the right side of the winch for operating snatch blocks, etc.

CONCRETE SURFACER AND FINISHER

The Concrete Surfacing Machinery Company of Cincinnati, Ohio, manufactures what is known as the Berg Concrete Surfacer and Finisher, the purpose of which is the removal of fins, board or form marks and all projecting inequalities on concrete surfaces in bridges, culverts and all other exposed work. This machine is driven by an electric motor which is either suspended from the shoulders of the operator or, if more conveinent, is mounted on a



J T. TRACTOR WITH WINCH ATTACHED.

FRONT AND REAR VIEW OF OPERATOR HOLDING CUTTER.

ball-bearing rubber-tired castor wagonette; the current being obtained from any electric light socket available.

The surfacer is provided with a cutter attachment, there being eight cutter wheels, which are renewable. After the cutter has removed all projections and roughness, a carbo disc attachment is used for smoothing the surface.

TURMO POWER PLANTS

The Turner & Moore Manufacturing Company of Detroit, Mich., exhibited at the Good Roads Show two models of its 2-cylinder industrial power plants and three models of the 4-cylinder. The 2-cylinder is manufactured in 4, 5 and 8-horsepower and the 4-cylinder in 15, 25 and 35-horsepower. In these plants the clutch lever, magneto switch, oil pressure gauge and idling latch are all at one end of the plant, making them very accessible to the operator. Where desired, the plant is furnished with right-angle gear, which was originally designed for concrete mixers that had the sprocket in the center of the mixing drum.

HEIL HOIST ON SEMI-TRAILER

The Heil Co., of Milwaukee, has installed a number of dump bodies and hydro hoists on Warner semi-trailers for use with different truck tractors.

The trailer has a fifth wheel attachment through which the power is transmitted from the motor to the hoist for dumping the load. The drive is mechanical throughout; no piping is required, as the pump is an integral part of the hoist. The dumping angle secured is approximately 45 degrees, with a tail gate ground clearance of about 4 feet.

The body shown on the photograph is made with removable sides, all steel tailgate and front end, and a substantial steel subframe. The operating rods for the tailgate are under the extended runboards where they are protected. Bodies can be furnished to suit the material which is hauled and The Heil Co. will be pleased to send information and data on this unit to anyone interested.

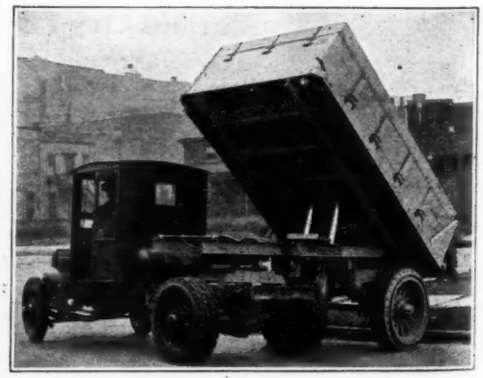
THOMAS HIGHWAY MOWER

The Thomas Manufacturing Company, of Springfield, Ohio, makes a mower for cutting weeds and grass along the sides of highways. The company has had fifty years of mower experience, five of them in making tractor mowers. The aim is to furnish a machine capable of continuous high speed operation with low cost of maintenance, capable of being hitched instantly to any truck or tractor and specially adapted to this work although embodying time tested mower principles.

The machine has Hyatt roller bearings, extra strong construction and two speeds for driving the knife. The gears are enclosed, running in oil. The cutting mechanism is adjusted to conform to the slope of the side of the road. If the cutter bar runs into a telegraph pole or fence post, a wooden pin in the hitch is sheared, thus uncoupling the mower from the tractor. If a piece of wire or tin wedges between the guards and the knife, the mower wheels will slide without damaging the moving parts. The angle of the cutting mechanism can be changed quickly to conform to the slope of the side of the road and the cutting mechanism can be raised vertically for passing close to telegraph poles or other obstruction. An operator seated on the mower can regulate all operations by convenient levers.

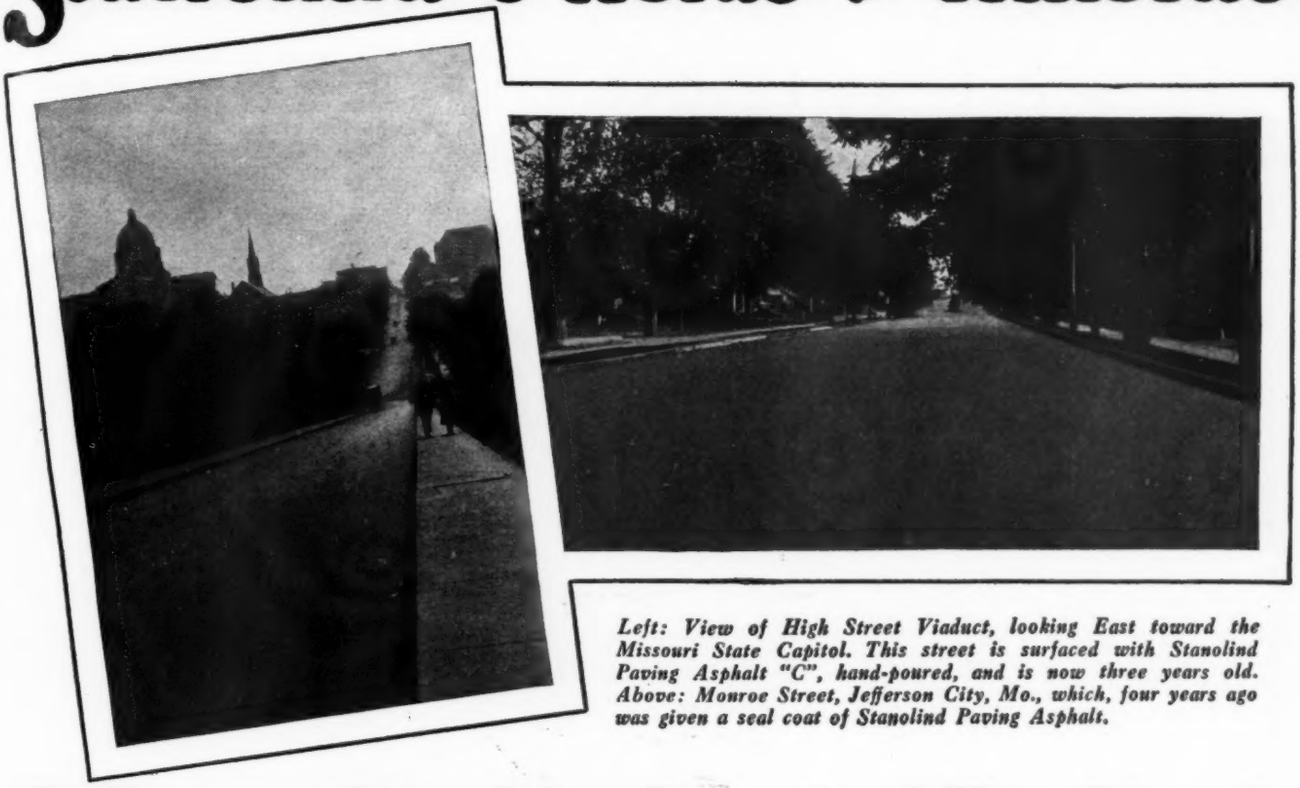
A SULLIVAN AIRPLANE TYPE COMPRESSOR

The Sullivan Machinery Company, of Chicago, showed at the road exhibit its new 220-foot V-type or airplane model portable compressor—a 4-cylinder machine developing 42-horsepower at 800 revolutions and direct-connected to a Buda 4-cylinder, 4-cycle engine. Two cylinders are set on each side of the axis of the machine at an angle of 90 degrees, thus securing excellent balance, with no perceptible vibration from the compressor when operating at full speed.



NO. 6 HEIL HOIST AND 8-YD. BODY IN CONNECTION WITH A PACKARD TRACTOR.

Stanolind "C" Holds on the Hillside



Left: View of High Street Viaduct, looking East toward the Missouri State Capitol. This street is surfaced with Stanolind Paving Asphalt "C", hand-poured, and is now three years old. Above: Monroe Street, Jefferson City, Mo., which, four years ago was given a seal coat of Stanolind Paving Asphalt.

Jefferson City, Mo., Proud of Her Streets

EVERY street commissioner and paving contractor should be interested in the High Street Viaduct paving job, pictured above at the left. The steep grade beyond the viaduct was originally waterbound macadam. Three years ago it was resurfaced with Stanolind Paving Asphalt "C", hand poured. The result is that this good street now carries much of the traffic to and from the state capitol.

The building of enduring streets and highways on sharp grades is frequently a very troublesome problem. In this, and many similar cases, the trouble was averted by the use of the proper grade of Stanolind Paving Asphalt. It formed a perfect bond with the macadam and is practically unaffected by climatic or thermal conditions. Even during the hottest of summer weather, there is no creeping of the surface coat.

The several grades of paving asphalt and road oil produced and marketed by this company are of exactly the right properties and specifications to insure the most satisfactory results. There is, of course, one particular grade which will give the best results on each specific job. It is the work of the engineers in our asphalt department to co-operate with street and road builders in the selection of the proper products to be used on each job and to aid them in determining the best type of construction and the best manner of application.

The service of these engineers—and it is of untold value to the cities and counties which avail themselves of it—may be had at any time and without cost. They are ready to give road builders the benefit of their broad practical experience and technical knowledge.

Any communications addressed to the Road Asphalt Department of the company at any city listed below will be given the most careful attention.

STANDARD OIL COMPANY

(INDIANA)

General Offices: 910 S. Michigan Ave., CHICAGO, ILLINOIS

ILLINOIS	INDIANA	IOWA	S. DAKOTA	N. DAKOTA	MINNESOTA	MISSOURI
Chicago	Evansville	Davenport	Huron	Fargo	Duluth	Kansas City
Decatur	Indianapolis	Des Moines	MICHIGAN	Minot	Mankato	St. Joseph
Joliet	South Bend	Mason City	Detroit	WISCONSIN	Minneapolis	St. Louis
Peoria	KANSAS	Sioux City	Grand Rapids	La Crosse		
Quincy	Wichita		Saginaw	Milwaukee		

The cylinders are single-acting, 5½-inch bore by 5-inch stroke, with pistons of the automobile type. The air valves are the standard Sullivan Wafer pattern for both inlet and discharge, giving an unusually liberal opening and permitting excellent volumetric efficiency. The compressor and engine are mounted on a cast-steel frame, and the outfit is supported on steel wheels, although highway trailer or skid mountings can be had if desired.

NEW SMITH MIXERS

The T. L. Smith Company, of Milwaukee, Wis., has just placed on the market two new tilting mixers, one in the 7-S size and the other, called the Mascot, said to be the smallest tilter ever made; thus giving this company a full line of tilting mixers from the smallest capacity to the largest made, the 4-cubic-yard mixer used on the Muscle Shoals Dam, Galveston causeways, etc.

The new 7-S is designed for big jobs where quality counts and where breakdowns must be eliminated. The drum is the Smith tilting double one. It is tilted for discharge through a set of gears with large reduction, making the operation very easy. The outstanding features are machine-cut engine gears, electric steel drum pinion, chilled iron thrust rollers, dustproof lubrication of all rollers, 2-cylinder gasoline engine of 6 to 8-horsepower. The all-steel wheels may be had with or without rubber tires. It is equipped with power loader and automatic measuring water tank.

The "Mascot" will be appreciated by contractors who specialize on small jobs. In spite of its small size, it embodies all the qualities of the larger Smith models. It weighs only 730 pounds and is easily portable and of compact construction. It is practically self-tilting, for the batch shifts to the discharge side as soon as tilting is started. It is necessary to tilt the drum only 45 degrees for discharging, which is readily accomplished from either side of the mixer by means of a tilting lever that slides back and forth and is easily moved by hand. A feed chute is provided, giving an unusually large charging opening, and the charging hopper serves as a rest for the cement sack when splitting it. It has practically all of the features giving sturdy strength and great durability that are found in the larger Smith mixers. It is furnished with 1½-horsepower gasoline engine. The capacity is 25 to 45 cubic yards per day, a batch consisting of 2½ cubic feet of mixed concrete, or 3 to 3½ cubic feet of loose, unmixed material.

BI-LATERAL FIRE HOSE COUPLINGS

The Bi-Lateral Fire Hose Company of Chicago furnishes couplings which they call "Bi-Lateral Rocker Lug Couplings," the advantage claimed for which is that they will ride over obstructions rather than catching in them, as do the lugs on ordinary hose couplings, and will not cut or snag the jackets when the hose is pulled off the apparatus at a fire, nor injure the hose jackets when loaded back on the apparatus. The oblong shape of the lug prevents it catching on curbs, ladder rungs, roof eaves or other obstructions. The company furnishes with them a combination spanner that will fit both the old round lug and these rocker lugs.

SNAP-ON WRENCHES

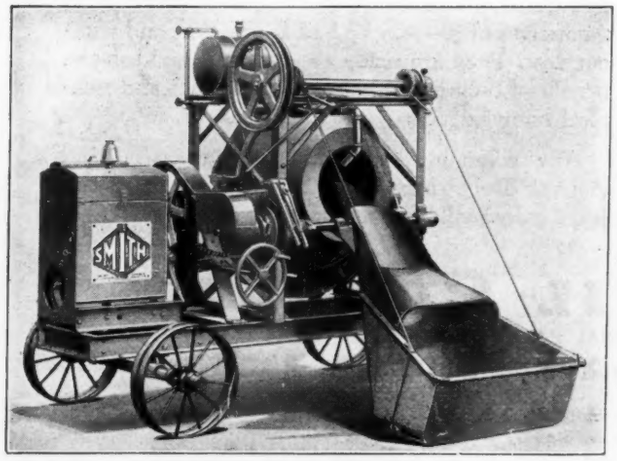
The Motor Tool Specialty Company of Chicago exhibited at the Road Show its entire line of snap-on socket wrenches, including the Giant Service Set and Flat Ratchet Wrenches, both new products; also its new Blue Point Ball Peen Hammers and Blue Point Open End and Tappet Wrenches.

The snap-on giant service set was of special interest to highway superintendents and road contractors, being adapted to use with the largest sizes of nuts and bolts in road trucks, crushers, scrapers and heavy machinery of all kinds. This set contains a 24-inch sliding tee and offset handle, a 16-inch and a 6-inch extension bar and a variety of hexagonal sockets in sizes from 1½-inch to 2⅜-inch openings; also square sockets in sizes up to 2 inches. The makers state that these wrenches are so powerfully built that they will stand up under the severest strain.

SNAP-ON GIANT SERVICE SET.

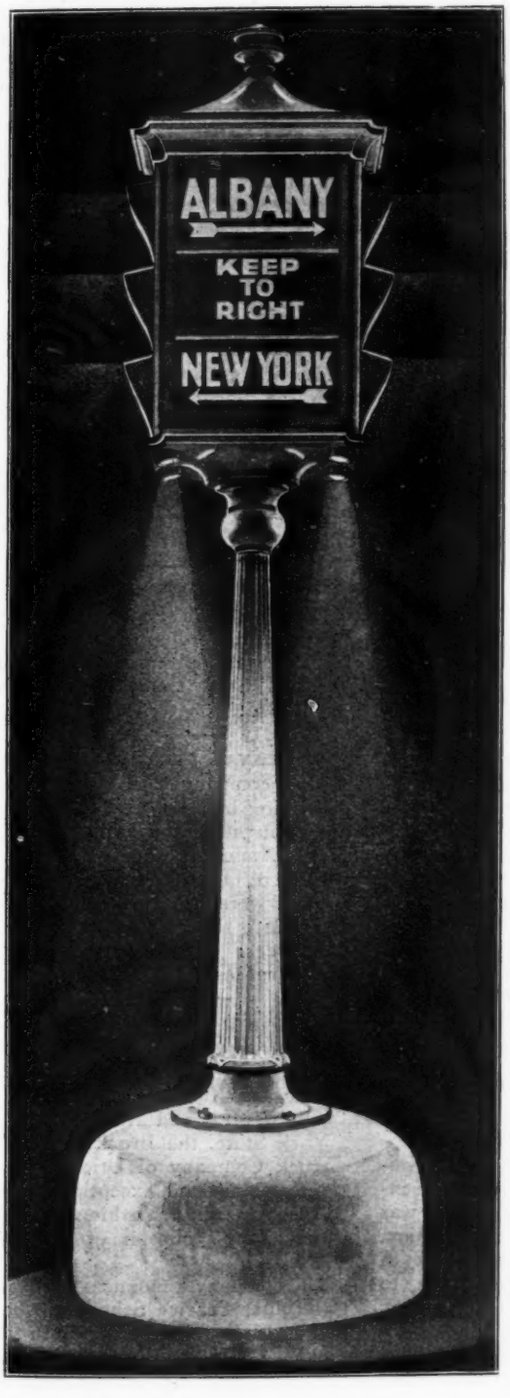
STREET LIGHT GLOBE RETAINER

The Chicago Globe Retainer Company of Chicago, Ill., has obtained patents on



SMITH 7-S TILTING MIXER, EQUIPPED WITH POWER LOADER AND WATER TANK.

SMITH MASCOT—2½ CU. FT. BATCH CAPACITY—EASY HAND TILT.



Another ESSCO Achievement

Those new illuminated directional signals that you have been noticing all over the country are Essco products. Traffic experts, city officials and public-spirited citizens have long agreed that "tin signs" are but of little consequence when used to warn incoming motor traffic of change of directions or of lurking danger—yet it was not until Essco perfected this new unit that the real answer was found to the problem.

TYPE K-4

Easily visible by day—but commanding and dominating by night, Essco Type K-4 is 100% efficient.

Most commonly used where highways lead out from or into corporate limits, at cross roads—in public squares—at or near depots, wharves and the like. In fact, at any place where it is necessary to give definite directions to the motorist.

ESSCO MFG. CO.

114 HARRISON ST., PEORIA, ILL.

a device for mounting globes upon street lamps in such a way as to provide a certain flexibility in the device which will permit the globe to yield slightly in case of a jar or heavy wind, but without entirely falling from the retainer, and will return the globe to its position as soon as the deflecting force is removed. The device consists essentially of two half-rings having horizontal top flanges which bolt around the bottom of the globe above the bead, the rings being made of thin springy metal, such as tin or brass, which will yield upward under the pressure of the bead when the bowl is tilted but spring back into position again.

NEWS OF SOCIETIES

(*Continued from page 42*)

NATIONAL PAVING BRICK MANUFACTURER'S ASSOCIATION

The 19th annual convention of this association was held at Chase Hotel, St. Louis, on January 20th to 22nd. After a joint meeting on the first day, the convention divided itself into three groups, owners and executives forming one group, field engineers and salesmen another, and superintendents and operating managers the third. These groups discussed the general subjects of better construction of brick pavements, modern sales methods, and economy in production. The principal speaker at the first meeting was E. W. James, Chief of Design of the United States Bureau of Public Roads, who told how Federal aid is being administered and sketched some of the history of the Bureau's activities. On the second day Louis H. Egan, president of the Union Electric Light & Power Company of St. Louis, delivered an address dealing with the modern methods of selling a quality product to the public.

Of special interest to engineers and users of brick pavements were two of the recommendations discussed by the field engineers, one being the use of brick pavements 2½ inches thick and the other the elimination of cement grout filler from the specifications of the Association. The Association in 1921 adopted a resolution declaring its preference for asphalt filler for general use, but without prejudice to any type of filler which might possess peculiar adaptation to special local conditions. The field engineers were almost unanimous this year in favoring the elimination of grout filler but no action was taken by the convention on the recommendation.

Several paving engineers addressed the Convention recommending the use of 2½-inch brick for all street and highway pavements designed to accommodate light and medium traffic. They pointed to the fact that the use of 2½-inch brick pavements began fourteen years ago and has increased rapidly during the past five years. This increase has been coincident with and presumably the result of two developments—the practical elimination of steel tired vehicles, but especially the concentration of attention upon the securing of stabilized subgrade and better foundations, leaving the function of the brick merely that of serving as a wearing surface. To serve this purpose alone, with wear greatly reduced by the vanishing of steel tires, 2½ inches of brick, it was claimed, would give as good service as 4 inches; and the reduction in thickness would result in a corresponding reduction in cost. It is the intention of the industry, as expressed at the Convention, to conduct a survey of the 2½-inch pavements now in use from the various angles of design, construction and durability.

WESTERN PAVING BRICK MANUFACTURERS ASSOCIATION

At its annual meeting in Kansas City on January 23rd this association elected the following officers: As president, G. E. Mosher, of the Coffeyville Vitrified Brick and Tile Company; as vice-president, W. L. Barr, of the Moberly Paving Brick Company; treasurer, Mrs. Marie Heiney; as secretary, G. W. Thurston; as governor for the national association, W. L. Barr, and alternate governor, M. M. Bushong, of the Metropolitan Paving Brick Company.

INDUSTRIAL NOTES

ERIE'S CHIEF ENGINEER DIES

The chief engineer of the Erie Steam Shovel Company, of Erie, Pa., E. J. Armstrong, died Jan. 21st at Savannah, Ga., where he had gone to regain his health, which had been failing for several years. He had been superintendent of the Ames Iron Works prior to 1900 when he entered the employ of the Ball Engine Company, now the Erie Steam Shovel Company, as chief engineer. Later he became director of this company. He had a wide acquaintance in the engineering and contracting field.

PAWLING AND HARNISCHFEGER CHANGES NAME

On December 3rd, 1924 the corporate name of the Pawling & Harnischfeger Company of Milwaukee was changed to Harnischfeger Corporation. This is a public acknowledgment of the debt the organization owes to Henry Harnischfeger, its president, who entered into partnership with Alonzo Pawling forty years ago. The firm started in a small way in Milwaukee but rapidly grew, and in 1887 became associated with the Shaw Electric Crane Company. The fire in 1903 prompted the management to seek a larger location and erect the present plant. In 1911 Mr. Harnischfeger purchased Mr. Pawling's interest in the business. In 1913 the company began building a line of gasoline-driven excavators, improving considerably on the former rather crude machinery used for this purpose. In 1923 a new extension of 35,500 square feet was added to the main shops and a 1,000-horsepower generating unit to the power house facilities. In 1924 the Hercules steel casting plant was purchased, giving the company complete control over the manufacture of their products from raw materials to finished machine.

The recent change in name is accompanied by no change in management, administration or business policies.

GARDINER & LEWIS

At the annual meeting of the directors of this company of engineers and manufacturers, on January 20th, Richard W. Lewis was elected as president and treasurer, Russell B. Reid as vice-president, and Jacob W. Winkler as secretary.

BARBER-GREENE COMPANY

Mr. George L. Sawyer, who has been with the Barber-Greene Company for the last five years and has been their representative in New York, has severed his connection with that company and will be succeeded by S. D. Brown in charge of the New York office at 141 Centre Street.

TRUSCON STEEL COMPANY

Effective with February, Oscar W. Loew will take charge of the advertising and sales promotion work of the Truscon Steel Company of Youngstown, Ohio.

DE LAVAL STEAM TURBINE CO.

This company has issued a leaflet describing how the city of Des Moines has brought its pumping plant up to date. Among other improvements, geared turbine-driven centrifugal pumps were installed, delivering directly into the city mains, with ability to increase the ordinary pressure for fire purposes.

HOLT MANUFACTURING COMPANY

This company announces the appointment of new distributors for Caterpillar Tractors as follows:

In Central and Northeastern New York State, the Brockway Motor-truck Company of Utica.

For Maryland, excepting Garrett. Allegany and Washington counties, Zach Johnson of Pasadena, Md.

The company announces that the 1925 Caterpillar Service School will be held at Peoria, Ill., on February 18th to 26th, inclusive. It expects to surpass the record of the 1924 school, which was attended by more than 200. The purpose of these schools is to supply complete information on the lubrication, operation and construction of Caterpillar tractors. The course is intensely practical, each student taking apart and assemblying a tractor under the direction of competent instructors. No charge is made for the instruction given in these schools.

NEWS OF THE SOCIETIES

March 17-18—ILLINOIS SECTION, AMERICAN WATER WORKS ASSOCIATION. 17th Annual meeting, Evanston, Ill.

March 27—NEW JERSEY SEWAGE WORKS ASSOCIATION. Annual meeting at the State House, Trenton.

April 20-25—NATIONAL CONFERENCE ON CITY PLANNING. International conference at New York City.

April 22-24—AMERICAN SOCIETY OF CIVIL ENGINEERS. Spring meeting at Cincinnati, O.

April 27-May 1—AMERICAN WATER WORKS ASSOCIATION. Annual convention at Brown Hotel, Louisville, Ky. Secretary, Wm. Niesley, 170 Broadway, New York.

June 2-5—AMERICAN ASSOCIATION OF ENGINEERS. Annual convention at Orlando, Fla.

June 22-26—AMERICAN SOCIETY FOR TESTING MATERIALS. Annual meeting at Atlantic City, N. J.

Sept. 7-12—NEW ENGLAND WATER WORKS ASSOCIATION. Annual convention on board steamer on St. Lawrence River.

AMERICAN WATERWORKS ASSOCIATION

The chairman of the Transportation Committee for the Louisville convention of the American Waterworks Association gives the following information for those who expect to attend the convention.

The fare-and-a-half certificate plan has been authorized by the railroads, a certificate to be obtained with the going ticket between Apr. 23rd and 29th. Arrangement has been made with the Pennsylvania Railroad for a special train to consist of one club car with baggage end; three 7-compartment, 2-drawing-room cars; two 10-section, one drawing-room, 2-compartment cars; and one 6-compartment observation car. This special train will be operated through from Pennsylvania Station, New York City, to Louisville. Additional cars can be added to the train at Pittsburgh if needed to provide for those joining the train at that city from the north and northwest. A special $1.25 table d'hote luncheon and a special $1.50 table d'hote dinner will be furnished on April 26th and an a la carte breakfast on April 27th.

This special train will leave Pennsylvania Station, New York City, at 10:05 A. M. Standard time (it is expected that daylight saving time will begin on this day); North Philadelphia at 11:58, Harrisburg at 2:25 P. M., Pittsburgh at 8:34 P. M. Those coming from Washington, D. C., will leave Washington at 10:55 A. M., April 26th and reach Harrisburgh at 2:20 P. M. The train will reach Cincinnati at 6:30 A. M. Central time on Monday and reach Louisville at 10:30 A. M. It is possible that a special train will also be obtained for making the return trip.

The rate to Louisville one way by this train is as follows: From Boston, $37.94; from New York, $31.32; from Philadelphia, $28.08; Washington, D.C., $24.62; Pittsburgh, $15.50. The Pullman rates from New York are $9 for a lower, $7.20 for an upper, $25.50 for a compartment and $31.50 for a drawing-room. From Philadelphia the Pullman rates are $8.25, $6.60, $23.25 and $30.00 respectively. From Pittsburgh they are practically one-half the New York rates. Those wishing to join the party and coming from Boston, Richmond, Buffalo, Reading etc., can take convenient service to the nearest point on the Pennsylvania Railroad as shown by the schedule and join the party at that point.

All requests for reservation on this special train must be made direct to the chairman of the Transportation Committee, Walter H. VanWinkle, Suite 1981, 50 Church St., New York City. All requests for reservations must be accompanied by check covering the fare and the reservation desired. Those desiring to have baggage carried on this special train should ask for special printed tags which the Transportation Committee will send them to insure that the baggage goes on this train.

The Committee also desires that those wishing to reach Louisville from other points write to the member of the Transportation Committee from their district. The other members of this Committee are: W. E. Cox, Neptune Meter Company, Chicago, Ill.; S. M. Lofton, Columbian Iron Works, Chattanooga, Tenn.; T. C. Clifford, Pittsburgh Meter Company, East Pittsburgh, Pa.; Walter Chellow, Buffalo Meter Company, Buffalo, N. Y.; Joseph Ivy, American Cast-Iron Pipe Company, Kansas City, Mo.; and Stephen S. Taylor, Superintendent of Water Department, New Bedford, Mass.

NEW ENGLAND WATERWORKS ASSOCIATION

The February meeting of this Association held in Boston on February 10th was an unusual one in that a large number of fire chiefs from New England cities were present as guests to engage in discussion of the subject, "Co-operation Between Fire and Water Departments." The attendance was about 165. Those who spoke on this subject included Thomas E. Lalley, assistant engineer of the Boston Department of Public Works; John S. Caldwell, chief engineer of the New England Insurance Exchange; Patrick J. Hurley, chief of the Holyoke Fire Department, and Harry Holmes, chief of the Milton Fire Department. Mr. Lalley considered it desirable that the water department have an emergency wagon and crew to respond to all multiple alarms of fire. He referred to the more efficient service that might be rendered by the fire department if it would report to the water department all hydrants used and defective condition of hydrants found in using them. Mr. Caldwell maintained that the fire chief should be consulted when planning the location and size of hydrants, number of outlets etc. In addition to those named, quite a number of superintendents of waterworks, members of fire departments and representatives of fire insurance companies engaged in the discussion.

In addition to this main topic, a paper entitled, "The Electric Pumping Plant of the Kennebeck Water District," was read by Arthur L. Shaw, with the firm of Metcalf & Eddy; and "Some Results of Pipe Cleaning" were described by Burt B. Hodgman of the National Watermain Cleaning Company.

Details of the unusual convention of this association to be held on a steamer September 8th to 11th, have just been made public. The convention will be held on the steamer Richelieu of the Canada Steamship Lines and reservations are to be made through George E. Marsters, Inc., 248 Washington St., Boston. The New England Waterworks Special will leave South Station, Boston, at 7 P. M. on Sunday, September 6th, Albany at 11:40 and stops will be made at Worcester, Springfield and Pittsfield. The train is due to reach Clayton, N. Y., at 7 A. M. Monday morning, where the guests will be transported to Alexandria Bay, where rooms will be provided at the Crossman or Thousand Island House. A trip by motorboat will be made during the day among the islands. There will also be the first session of a golf tournament for the members.

On Tuesday morning the party will board the steamer at 8:15 for an all-day sail up the St. Lawrence River. At Prescott they will transfer to one of the Canada Steamship lines built especially to run the rapids of the St. Lawrence. Passing the rapids they will reach Montreal and there passengers and baggage will be immediately transferred to the Richelieu for a 4½-day cruise on the St. Lawrence and Saguenay rivers. This is a new steamer 332 feet long, 66 feet beam, 15 feet 6 inches draft. She is an oil burner, with a speed of 20 miles an hour. Recreation, amusement and social rooms are separated entirely from the sleeping quarters on board, so that rest and quiet are possible at all times. —The technical sessions of the convention will begin shortly after 8 P. M., the hour for leaving Montreal.

On Wednesday the steamer will lie up at Murray Bay all the afternoon, when the second session of the golf tournament will take place. On Thursday morning St. Alphonse will be reached and from there the trip down the Saguenay river will be taken. The third session of the golf tournament will be held that afternoon at Tadousac. Quebec will be reached Thursday night and the steamer will remain there all day, the party being

taken on an interesting ride around both the old and the new city and to the waterworks plant. In the afternoon the fourth session of the golf tournament will be held. The steamer will return to Montreal reaching there about 8 A. M. Saturday, when the party will be transferred to the Hotel Windsor, will visit the Montreal waterworks and other points of interest. The fifth and last session of the golf tournament will take place in Montreal on Saturday. On Saturday night a special train will leave Montreal to return to New England.

Tickets including transportation and all meals for the complete trip, pullman, transfers etc., cost $115.50 from Boston, $117.50 from Manchester, $106.50 from Albany. Those who wish to omit the Thousand Island trip can leave Boston and other points Monday evening, spend Tuesday in Montreal and join the main party Tuesday evening. The cost for those omitting the Thousand Island trip will be $20 less than stated above. The Executive Committee desires that all reservations for the trip be made on or before July 1st so that the many details of the trip may be properly worked out.

NEW JERSEY SEWAGE WORKS ASSOCIATION

The annual meeting of this association will be held at the State House in Trenton, N. J., Friday, March 27, at 11 a. m. The program includes the following papers: "Sludge Drying and Handling," by Weston Gavett of New York City; "Workings of the New Jersey Licensing Law for Plant Operators," by H. P. Croft, chief engineer of the State Board of Health; "Repairing Break in a Deep Tile Sewer Line," by Paul Molitor, superintendent of the Madison-Chatham plant; "The Usefulness of Monthly Reports by Operators," by Charles Nichols, engineer of the State Board of Health; "Progress Report of the Sewage Substation Laboratory," by William Rudolfs, chief of the laboratory.

Advance information from the committee on forming a national association indicates that it will recommend that the association retain its present name, but it will welcome all comers as usual, without regard to geographical situation.

NATIONAL CONFERENCE ON CITY PLANNING

The first international town, city and regional planning conference in the United States will be held in New York City April 20 to 25 at the invitation of Governor Smith, the American City Planning Institute, the National Conference on City Planning, and several other associated organizations. At the same time there will be shown at the Hotel Pennsylvania and the Grand Central Palace probably the largest and most comprehensive exhibit of city planning material ever assembled. That at the Grand Central Palace will be part of the exhibit of architectural and allied arts under the auspices of the American Institute of Architects and the Architectural League of New York, which will meet in conjunction with the Congress. The International Federation of Town and Country Planning and Garden Cities, which meets for the first time in this country, will be represented by some of the most eminent city planners and housing authorities in Europe.

The conference will be of special interest and value to this country, as it will give opportunity to secure first-hand information on an important phase of city and regional development—the better distribution of population and its effect on problems of transportation and traffic.

Final programs have not yet been made public, but according to the preliminary program the following subjects will be discussed:

"Progress In Planning Throughout the World," by George B. Ford, president of the National Conference on City Planning, and D. Everett Ward, president of the American Institute of Architects.

Under the general head of Regional Planning—"How to Lay Out the Regions for Planning, and the Government of Regions in Relation to Planning," by Alfred Bettman and Thomas H. Reed. "A Plan for the New York Region," by Thomas Adams. "Transportation in the New York Region," by Col. William J. Wilgus.

Under the head of Better Distribution of People and Industries Within the Region—"Methods of Distribution," by Dr. R. Heiligenthal of Berlin and Dr. Raymond Unwin of England. "Local Government," by Dr. Van Poelje of the Hague and G. Montagu Harris of England. "Finance," by C. B. Purdom of England. "Traffic," by Auguste Bruggeman and Jacques Greber of Paris.

"Arterial Roads," by G. L. Pepler of England and Dr. Joseph Brix of Berlin.

Under the head of Waterfronts and Waterways, Their Development for Commerce and Recreation—"Recreational Development," by Jay Downer of New York. "Commercial Development," by Col. P. L. Gerhardt of New York.

"City Planning as a Permanent Solution of the Traffic Problem," by Morris Knowles of Pittsburgh.

Under the head of Planning of Unbuilt Areas—"Platting or Site Planning," by Prof. Sverre Pederson of Norway. "Zoning of Undeveloped Areas," by Robert Whitten of Cleveland. "Protecting the Official Street Plan," by Philip Nichols of Boston.

Under the head of Zoning Practice in America—"Fundamentals of American Zoning with Special Reference to the Vital Importance of Court Review," by Edward M. Bassett of New York. "Zoning and the Street System," by Lawrence V. Sheridan of Indianapolis and T. Glenn Philips of Detroit. "The Influence of Zoning on High Buildings and Street Traffic," by E. P. Goodrich and Harvey W. Corbett of New York.

Opportunity will be given to study problems of development and their solution in the metropolitan area of New York, including the administration of zoning and the effects of zoning in and about New York City.

U. S. CIVIL SERVICE EXAMINATIONS

Associate and Assistant Engineer (Civil, Electrical, Mechanical, Signal). Applications received until April 4th. To fill vacancies in the Bureau of Signals and Train Control Devices and the Bureau of Valuation, Interstate Commerce Commission. Entrance salaries, $3,000 and $2,400, respectively, a year. To prepare exhibits from underlying data for presentation in valuation hearings; to make detailed analyses of cost data; to investigate special problems in railroad construction including studies of contracts, leases, etc.; to confer with carriers' representatives on valuation matters, and to perform related work. Associate engineer to, under general direction, prepare studies of grading distribution including mass diagrams and similar studies; to investigate merits of carriers' claims for errors in underlying engineering reports prepared by Bureau of Valuation; to confer with carriers' representatives and to perform related work. Assistant engineer to, under general direction, compute quantities of roadway and track physical items from field notes, profiles and plans; to assist in analyzing cost data and related matters pertaining to railroad valuation work.

Junior Engineer. Applications close March 28th. To fill vacancies in various branches of Government service. Entrance salary, $1800 a year. To perform such work as routine testing, inspection of engineering material, drawing up plans for minor projects, prepare specifications for engineering material or apparatus, perform field work, make computations, prepare maps, assist in conduct of experimental research tests, compile reports and handle technical correspondence.

Junior Cartographic Engineer. Applications close March 28th. To fill vacancies in Coast and Geodetic Survey. Entrance salary, $1,860 a year. To utilize data resulting from field surveys of Bureau, or obtained from wide variety of miscellaneous sources in compiling and correcting of nautical charts which guide all vessels traversing the navigable tidal waters of the United States and its possessions and other professional work in related physiographic problems.

Senior Accountant and Auditor, Accountant and Auditor, Associate Accountant and Auditor, Assistant Accountant and Auditor and Principal Accounting and Auditing Assistant. Applications close April 4th. To fill vacancies in Bureau of Accounts and Bureau of Valuation, Interstate Commerce Commission. Entrance salaries—$3,300, $3,000, $2,700, $2,400 and $2,100 a year, respectively. To engage in field examinations of accounts of common carriers for determining observance and application of accounting regulations prescribed by the Interstate Commerce Commission; to prepare reports of such field examinations; to detect violations of interstate commerce act; to develop other information required by Interstate

(*Continued on page 52*)

AMERICAN ASSOCIATION OF ENGINEERS

At a meeting of the board of directors of this association in January it was voted to make radical changes in the association. President Harold Almert was asked to occupy a newly-created position of directing manager of the association, and thereupon resigned as president and was succeeded by the first vice-president, Morris Bien. This action was believed by the directors to be justified by the necessity for more intensive field work to stimulate the interest of members and strengthen chapter activities. Upon learning of this action, however, the New York Chapter of the association on January 27th, passed formal resolutions disapproving of this action, believing that, even if within the constitutional rights of the directors, it was a virtual and moral evasion of the intent of the constitution and by-laws and was unethical, unjustified, unwise and inimical to the best interests of the association; and Mr. Bien, whom the section recognized only as active executive officer, was requested to submit the case to the Practice Committee of the association.

In addition to this, the directors decided to make the association's journal, "Professional Engineer," a magazine of general interest to engineers, and empowered the committee to turn it over to a subsidiary publishing corporation. It also decided upon expansion of the employment service and took preliminary steps for establishment of educational courses for members. The board also expressed itself in favor of fixing the national dues at an amount between $6 and $7.50, leaving it to the individual chapters to fix the local dues. June 2nd to 5th was adopted as the time for the next convention, to be held at Orlando, Fla.

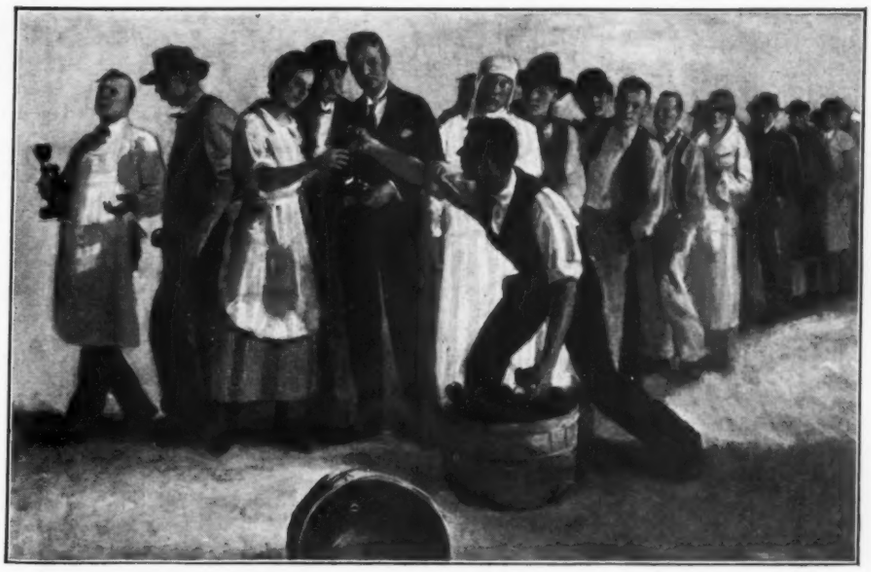
KANSAS ENGINEERING SOCIETY

This society on December 12th elected as president, O. E. Conrad, professor of civil engineering of the Kansas State Agricultural College; as vice-president, W. E. Baldrey, city engineer of Topeka, and as secretary, Ernest Boyce, engineer of the State Board of Health.

MINNESOTA SURVEYORS AND ENGINEERS SOCIETY

This society held its 13th annual convention in Minneapolis on January 22 and 23. The following officers were elected: President, F. H. Curtis; vice-president, M. E. Chamberlain; secretary and treasurer, E. G. Briggs.

Papers were read before four sections dealing with highway, municipal, drainage and surveying subjects, respectively. E. O. Hathaway read a paper entitled "The Bureau of Public Roads and Its Relation to State and County Highway Development." "Motor Bus Transportation," by Edgar F. Zelle; "The Location of Trunk Highways Through Cities," by D. W. Webster; "The New Sewerage System of Austin, Minn.," by Phil Smith, and "Rainfall and Runoff in Relation to Drainage," by W. J. Schleick, were among the other papers read.



Give us Telephones

Following the war, when business and social life surged again into normal channels, there came the cry from homes, hospitals, schools, mills, offices—"Give us telephones." No one in the telephone company will ever forget those days.

Doctors, nurses and those who were sick had to be given telephones first. New buildings, delayed by war emergency, had to be constructed, switchboards built and installed, cables made and laid, lines run and telephones attached.

The telephone shortage is never far away. If for a few years the telephone company was unable to build ahead, if it neglected to push into the markets for capital and materials for the future's need, there would be a recurrence of the dearth of telephones. No one could dread that eventuality so much as the 350,000 telephone workers.

Bell System engineers measure and forecast the growth of communities; cables, conduits, switchboards and buildings are planned and developed years ahead of the need, that facilities may be provided in advance of telephone want. Population or business requirements added to a community must find the telephone ready, waiting.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES
BELL SYSTEM
One Policy, One System, Universal Service

HIGHWAY INDUSTRIES EXHIBITORS ASSOCIATION

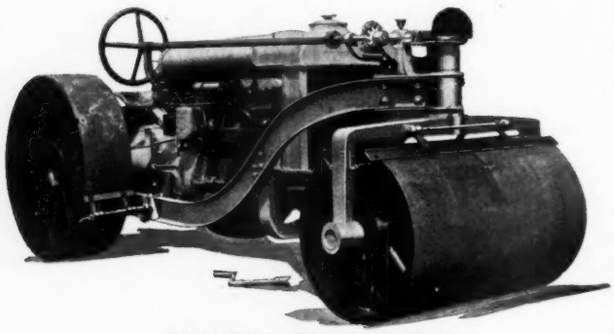
At the annual meeting of this organization in Chicago, C. R. Ege, manager of the Highways Bureau of the Portland Cement Association, was chosen president; C. F. Messinger, of the Chain Belt Company, vice-president; Fred G. Hudson, Western manager of "Engineering News-Record," secretary, and H. S. Greene, vice-president of the Barber-Greene Company, treasurer. The new directors are: P. L. Griffiths, of the American Tar Products Company; Chester Lehman, of the Blaw-Knox Company; S. M. Williams, of the Autocar Sales and Service Company, and C. V. R. Fullenwider, of the Philip Carey Company.

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

WINCHELL ROAD ROLLER

Horst and Strieter Company, of Davenport, Ia., manufacturers a 3 to 4 ton roller used with a Fordson tractor for road work, city streets and alleys, public parks, etc. It is so designed that by removing the front wheels of the Fordson it can be attached to the tractor in an hour's time, as there are only three pins and three bolts used in making the change. The regular Fordson rear wheels are used, but the cleats are removed and the wheels themselves filled with concrete to give the necessary weight. Holes are left in the wheels for inserting sod pins for use when the roller is used on lawns or slippery roadways. The front wheel is made with four rolls instead of the customary two, facilitating easy steering and manipulation.



WINCHELL ROAD ROLLER

The rolling width is 62 inches, wheel base 96 inches and turning radius 19 feet. The front rolls are 28 inches in diameter and the rear rolls 42 inches. The weight on the front rolls is 2,700 pounds and on the rear rolls 4,000 pounds. The speeds are 1.48 and 2.73 miles per hour forward and 2.61 reverse.

DETROIT CAB DELUXE

The Detroit Motor Products Company of Detroit, Mich., manufactures a cab which it says will fit any truck and for which, in addition to rugged durability, the company claims comfort and safety details, unobstructed vision in every direction and attractive appearance.

The truck is built with hardwood frame and heavy steel panels, with doors having heavy metal panels steel bound, under spring tension and rattle and rumble proof. Two sliding windows on each side, which are fastened to a track just under the roof, can be swung up to the roof of the cab and securely fastened. In either position the windows are under spring tension and rattle proof. The cab is upholstered with deep cushions and full coil springs with first-grade covering. The size of the seat box leaves plenty of room for the largest gas tank.

The cab is made in three sizes, Model A, 50 inches wide, 45 inches deep and 57 inches high; model B, 53 inches wide, 47 inches deep and 60 inches high; and Model C, 57 inches wide, 47 inches deep and 60 inches high.

GRAVEL CRUSHING AND SCREENING PLANT

The Good Roads Machinery Company, of Kennett Square, Pa., has recently designed equipment for handling gravel from pits and preparing it for road material known as the Climax Gravel Crushing and Screening Plant. The plant consists of a Climax steel frame rock crusher mounted on four wheels, with a steel frame folding type elevator, thus facilitating the easy moving of the plant from one place to another. A second elevator of large capacity is set at right angles to the crusher and extends into the pit to receive the bank run material, which is dumped into a steel hopper by means of scrapers or other device. This side elevator is supported on a substantial frame of angle iron construction which also carries the driving mechanism. A one-power unit drives the entire plant. The steel hopper through which the material is delivered to the side elevator is provided with a regulating gate to prevent overloading.

The side elevator carries the gravel from the hopper to a grizzly screen located over the mouth of a crusher. The fine material is spouted directly to the crusher elevator and the large size drops into the mouth of the crusher The crushed and originally fine material are delivered to a stock pile or, if preferred, into a bin; or the different sizes may be separated out by a revolving screen. It is apparent that after material is delivered into the hopper the entire process is automatic.

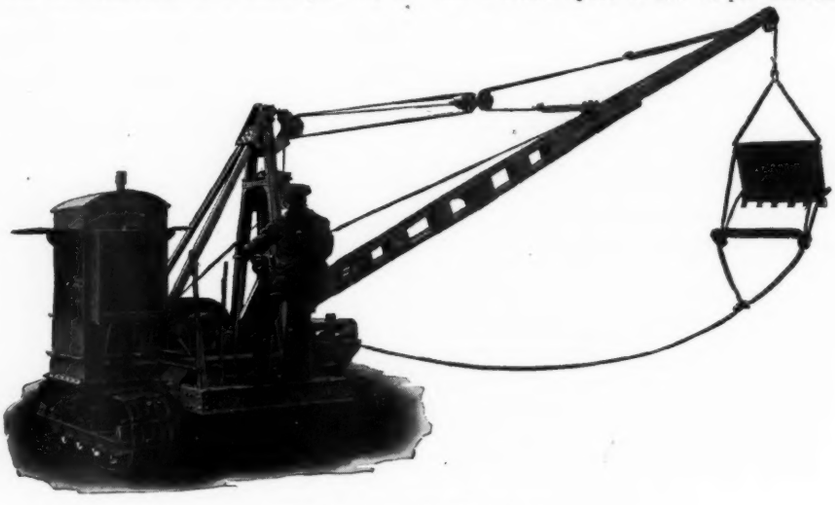
Under ordinary operating conditions, this outfit will handle about 150 yards of crushed gravel per day, only three to four men and a team being necessary.

NEW P. & H. BACKFILLER PRODUCED

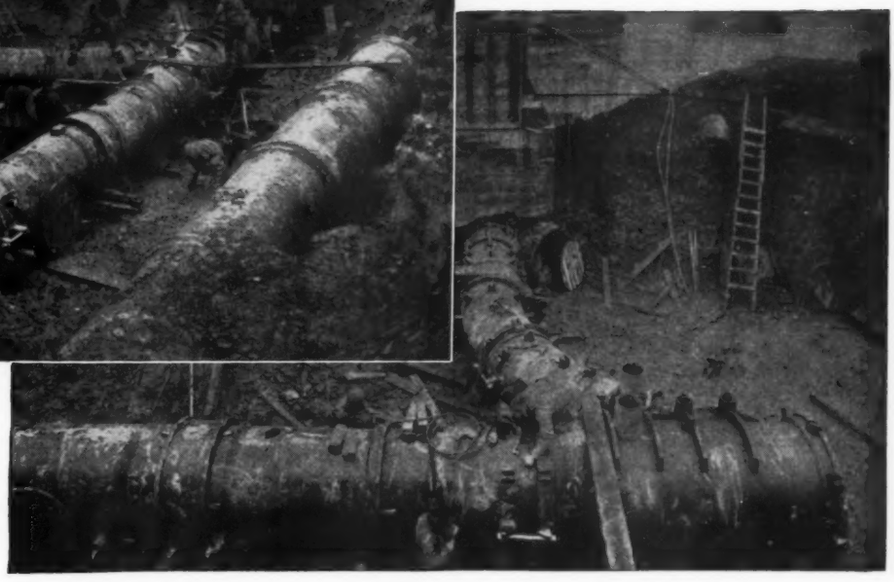
A new, one-man, high quality backfiller has been designed and recently placed on the market by the Harnischfeger Corporation (formerly the Pawling & Harnischfeger Co.), Milwaukee, Wisconsin.

In this backfiller all steel construction of heavy duty parts is used; all shafts are of steel, turned and ground to micrometer size; all gears and pinions are of steel and have teeth double cut from the solid; every movement of the machine is controlled by friction clutches, giving easy control and quick movements; the corduroy shoes are of cast steel, in one piece, and the pin holes are drilled out and not cored. The treads are full Corduroy, each side being independently driven, and steering is made positive by using independent clutches and steering brakes.

The machine is easily controlled by one operator, since all the levers are closely grouped at the center of the machine and have a straight pull. The boom is adjustable in steps of 18 in. between 21 ft. and 30 ft., and the change may be made in a very few minutes in the field. The boom has a half circle swing, making possible a great amount of work from one location. The boom swing and hoist mechanisms are power driven through worm gearing and controlled by a friction clutch. This makes easy and quick movements possible. The scraper is self-filling, of heavy material and fitted with renewable steel teeth, and has a working speed of 130 ft. per minute and a return speed of 275 ft. per minute.



NEW P. & H. BACKFILLER



Cast Iron Headers at Riverside Station, Milwaukee, Wis.

The Starting Point of Distribution

The pictures reproduced above show the headers in front of Milwaukee's new pumping station while under construction. At no point is reliability more necessary than in the mains leaving the station. Chances of interruption to service must be kept to a minimum, as a shut-down at this point for repairs to mains is a serious matter. Pumps would have to be shut down and the supply to the city restricted.

Cast Iron Pipe, with its long record of reliability, was chosen for the work, and in this city as in many others, the water passes through Cast Iron Pipe all the way from the pumps to the service pipes of the consumers.

THE CAST IRON PIPE PUBLICITY BUREAU, Peoples Gas Building, Chicago

CAST IRON PIPE

THE BELL & SPIGOT JOINT

THE ACCEPTED STANDARD FOR UNDERGROUND CONSTRUCTION

Our new booklet, "Planning a Waterworks System," which covers the problem of water for the small town, will be sent on request

Send for booklet, "Cast Iron Pipe for Industrial Service," showing interesting installations to meet special problems

The motive power is supplied by a 25 H. P. Waukesha motor, equipped with a Ricardo head and cooled by a large radiator. The motor and gasoline tank are all enclosed in a steel house which may be locked. This gives complete protection from the weather and from tampering.

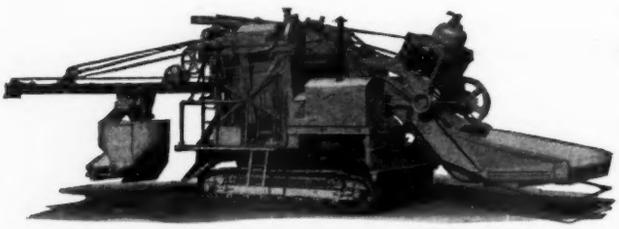
This backfiller may be mounted on a standard flat car or heavy truck without dismantling. It may be loaded or unloaded under its own power. The total weight with boom and scraper is 13,000 lbs. It will be known commercially as the P. & H. Model 25 Backfiller.

THE 1925 REX PAVER

The 1925 Rex 21-E Paver has 21 improvements over last year's model, consisting for the most part in refinements of the operation mechanism and the inclusion of superior materials to increase speed and working life, notably phosphor-bronze bushings, Sivyer electric steel castings, certified malleable iron castings, special alloy shafting, and high carbon steel boom channel.

The paver is Waukesha motored and can also be equipped for steam or electric power.

The improvements increase still more the speed of getting the materials into and out of the drum—the big factor in increasing output. The builders have also concentrated on shock absorption in the extension of the use of chain drives and the operating mechanism of the boom and bucket.



THE 1925 REX 21-E PAVER

HERCULES POWER UNITS

The Hercules Motors Corporation of Canton, Ohio, manufactures a power unit which has for some years been used in trucks and tractors and is now made available to the power user as an individual unit. It is sold fully equipped for work, clutch and reduction gears being furnished according to the power needs. Among the uses made of this unit are the operation of asphalt plants, concrete mixers, pumps, gasoline locomotives, belt conveyors, road rollers and other road machinery, street sprinklers, etc. The unit is manufactured with a range between 20 and 40-horsepower at 800 to 1,800 r.p.m.

The engine housing is made of heavy-gauge sheet metal, with removable panels, or the whole housing can be removed quickly. The fans and all shafts run on Timken tapered roller bearings. The gasoline tank has a capacity of 15 gallons. The reduction gears all have 2-inch face and can be furnished for reductions of 2:1, 3:1 and 4:1. The engine has four cylinders cast *en bloc* with detachable heads. The drive is helical gear. The crankshaft has three bearings of two inches diameter, two being 2 15/16 inches long and the rear bearing 3 5/16. The crankcase is of cast-iron integral with the block. The lubrication is forced feed by gear pump. Simplicity of construction makes it possible to assemble the Hercules engine almost entirely with a single wrench.

The makers had this power unit, known as Model O, on exhibition at the Good Roads Show; also a new series model L and G which is just being introduced.

NEW HOLLAND ROCK CRUSHERS

The New Holland Machine Company of New Holland, Pa., manufactures rock crushers of three types—swinging jaw for primary crushers, roll crushers for recrushing, and hammer crushers for clinkers, soft sand rock, or other material not easily handled by the jaw or roll type.

The crushers are made of various sizes with capacities from 1 to 12 tons per hour. They are made stationary or portable, and with or without elevators or revolving screens. The company also makes portable stone bins of either 15 tons or 25 tons capacity. These are built in sections bolted together. A ratchet lever windlass on each end of the bin provides means of raising or lowering the bin from a truck provided for transporting it.

Crusher outfits are made containing jaw and roll crushers combined, by which large stone can be broken to the finer grades by the one portable outfit. This machine can be used for making fine aggregate or for chips and rock for all purposes down to ½-inch screen size.

AMPCO VALVES

The American Metal Products Company, of Milwaukee, Wis., manufactures valves of Ampco metal for which it claims that, even under the most intense heat of severe motor operation, they will not pit or warp and thus will retain the perfect seating of the valves without regrinding. Carbon, they state, does not form on Ampco metal, and the friction of constant use develops a hard, smooth surface skin. This metal is made of tensile strength varying from 50,000 to 100,000 pounds to a square inch, and can be made as hard as desired. That used in the valves is practically wear-proof. The metal is in the nature of a bronze, but with the strength and toughness of steel. It is a bright golden yellow and takes a polish and, having high acid resistance, does not corrode.

INDUSTRIAL NOTES

GENERAL MOTORS TRUCK COMPANY

Otto E. Stoll, general manager of this company, announces the appointment of A. J. Banta as assistant to the general manager, with complete charge of engineering, manufacturing and purchasing. Mr. Banta has had more than twenty years experience in the automotive industry in Detroit and in the east.

The company has just opened two new branches, one in Jacksonville, Fla., and the other in Dayton, Ohio.

DE LAVAL NEW ENGLAND AGENCY

The DeLaval Steam Turbine Company of Trenton, N. J., announces that in the future all products of that company as well as of the DeLaval Separator Company will be handled exclusively in New England by the Turbine Equipment Company, Chamber of Commerce Building, 80 Federal Street, Boston, Mass. F. R. C. Boyd, for fifteen years connected with the Power Equipment Company, is president of the Turbine Equipment Company.

DIXON COMPANY'S BOSTON OFFICE

The Joseph Dixon Crucible Company of Jersey City announces the removal of its Boston office from 49 Federal Street to 80 Federal Street, the new Chamber of Commerce building.

T. L. SMITH COMPANY PHILADELPHIA AGENTS

The T. L. Smith Company of Milwaukee, Wis., announces that the Beckwith Machinery Company of Brown & Frost Streets, Philadelphia, is now the agent for that company in that city as well as in Pittsburgh and Cleveland, where also it represents the Smith Company. A full stock of mixers and parts is kept on hand.

BAKER MANUFACTURING COMPANY

This company announces that it has recently appointed, as distributors of Baker-Maney scrapers, the following firms: Chadwick Brothers Company, at Milwaukee; The Lewis Motor Company, at Fargo, N. D.; Banks-Miller Supply Company, at Huntington, W. Va.; Baker Equipment Company, at Detroit, Mich.; Beaumont Export & Import Company, at Beaumont, Tex.; Holt Texas Equipment Company, at Dallas, Tex., and Clinton & Held Company, at Denver, Colo.

NEW CALCIUM CHLORIDE PATENT

Patent No. 1,527,121, dated February 17, 1925, has been issued to The Dow Chemical Company of Midland, Michigan, covering a process of manufacturing metallic chloride products and also covers products manufactured by the new process. The patent broadly covers the improved form of Calcium Chloride which the Dow Chemical Company has marketed for a number of years and which is being widely used for dust prevention on gravel and stone roads; also for curing concrete, its main property being the absorption and retention of a

LAMBERT FROST PROOF METER

The Measure of true value in a water meter

The certainty of performance, the long and uninterrupted service for which the LAMBERT METER is particularly noted, tell the water works engineer of today what he most wants to know—the value that is built into a meter.

When a meter embodies unusual engineering achievement; when it is the product of experience, when it yields the unbroken service which LAMBERT users prize so highly, can more conclusive evidence of value be supplied?

Money Never Bought More in a Meter

Catalogue showing full line of meters for every requirement for the asking.

THOMSON METER COMPANY

100-110 Bridge Street **Brooklyn, N. Y.**

LAMBERT

FROST PROOF METERS

volume of moisture sufficient to cure concrete without earth or straw covering or ponding, and without need for pipe lines and water pumping. The same moisture-absorbing property is said to be the reason for its use to maintain gravel and stone road surfaces in a firm, moist and dustless condition with only two treatments annually.

The Calcium Chloride covered by the new patent is a non-caking flake which the new process renders suitable for packing in bags and for shipping and storing in that form without caking, since it is superficially dehydrated to the point where the tendency to cake in the package is reduced. The flake-like particles are superficially dried and a portion of the water of crystallization is also removed.

The patent issued also covers like processes for the manufacture of other metallic chlorides and should be of interest to all users of such products.

PARADON APPOINTS NEW REPRESENTATIVES

Several changes and additions have recently been made to its representatives by the Paradon Engineering Company, manufacturer of chlorinating apparatus, Long Island City, N. Y. Some of these are as follows: The Water Works Supply Company, San Francisco and Los Angeles, has been appointed for the Pacific Coast; Charles T. McFarland, Kansas City, Mo., middle West; Lawrence K. Cecil, Oklahoma City, Okla., Southwest; and the General Supply Company, of Canada, Ltd., Ottawa, Montreal and Toronto, Canadian representatives. George E. Gilbert, formerly of Wallace & Tierman Company, Inc., has also joined the selling force.

CEMENT ASSOCIATION

The Portland Cement Association has appointed Charles B. Nims as district manager at Portland, Ore., with offices in the Gasco Building. Mr. Nims joined the Portland Cement Association in 1922 as field engineer in Oregon.

ELWYN E. SEELYE

Elwyn E. Seelye, structural engineer, of 101 Park Avenue, New York City, announces the establishment of a special department for the control and design of concrete mixes along the lines of Lewis Institute methods. Directly in charge of this work will be George Conahey whose work under Professor Abrams and with the American Portland Cement Association renders him particularly capable to have charge of this work.

(*Continued from page 46*)

Commerce Commission; to assist in detail work of field examinations and in preparation of reports thereof, and to perform other related work.

Engineer (civil), Associate Engineer (civil, electrical, mechanical, signal), Assistant Engineer (civil, electrical, mechanical, signal). Applications close April 4th. To fill vacancies in Bureau of Signals and Train Control Devices and Bureau of Valuation, Interstate Commerce Commission. Entrance salaries, $3,800, $3,000 and $2,400, respectively. To (engineer-civil) prepare exhibits from underlying data for presentation in valuation hearings; to make detailed analyses of cost data; to investigate special problems in railroad construction involving studies of contracts, leases, etc.; to confer with carriers' representatives on valuation matters, and perform related work.

Associate Engineer (civil) to, under general direction, prepare studies of grading distribution involving mass diagrams and similar studies; to investigate merits of carriers' claims for errors in underlying engineering reports prepared by Bureau of Valuation; to confer with carriers' representatives; and perform related work. Assistant Engineer (civil) to, under general direction, compute quantities of roadway and track physical items from field notes, profiles and plans; to assist in analyzing cost data and related matters pertaining to railroad valuation work. Associate Engineer (electrical, mechanical, signal), to, under general direction, analyze plans and specifications; to conduct engineering tests involving application and installation of railway signals, interlocking plants and automatic train control systems and perform related work. Assistant Engineer (electrical, mechanical, signal), to analyze plans and specifications and assist in conduct of engineering tests involving application of railway signals, interlocking plants and automatic train control systems.

"STONE IS BEST BY EVERY TEST"

Specify

GRANITE for PAVING and CURBING

The Granite Paving Block Manufacturers' Association of the United States, Inc.

31 State St. Boston, Mass.

Representing

The World's Greatest Granite Quarries

NEWS OF THE SOCIETIES

April 20-25—NATIONAL CONFERENCE ON CITY PLANNING. International conference at New York City.

April 22-24—AMERICAN SOCIETY OF CIVIL ENGINEERS. Spring meeting at Cincinnati, O.

April 27-May 1—AMERICAN WATER WORKS ASSOCIATION. Annual convention at Brown Hotel, Louisville, Ky. Secretary, Wm. Niesley, 170 Broadway, New York.

April 29—WATER WORKS MANUFACTURERS' ASSOCIATION. Annual meeting, Louisville, Ky., at 10:30 A. M.

May 12-14—NATIONAL FIRE PROTECTION ASSOCIATION. Annual meeting at Chicago, Ill.

May 16—NORTHEASTERN SECTION, AMERICAN SOCIETY OF CIVIL ENGINEERS. Spring meeting at the Boston City Club.

June 2-5—AMERICAN ASSOCIATION OF ENGINEERS. Annual convention at Orlando, Fla.

June 22-26—AMERICAN SOCIETY FOR TESTING MATERIALS. Annual meeting at Atlantic City, N. J.

Sept. 7-12—NEW ENGLAND WATER WORKS ASSOCIATION. Annual convention on board steamer on St. Lawrence River.

Oct. 26-29—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention at Des Moines, Iowa.

NEW JERSEY SEWAGE WORKS ASSOCIATION

The tenth annual meeting of this association was held at Trenton, March 27, and was the best attended and snappiest meeting yet held. The great interest which the Association is attracting was shown by the fact that the attendance was 20% greater than the total enrolled membership, and many new members were added at the meeting.

Weston Gavett spoke on Sludge Handling and Drying. Four points emphasized, either in the paper or in the discussion, were: (1) Drying under glass. This, perhaps, attracted the most attention, the discussion indicating a strong trend in its favor as against open air drying. The cost of construction of a small but dependably effective area covered with glass and that of a large exposed area subject to the whims of the weather were shown to be about equal. Discussion brought out the suggestion of greater economy of maintenance in the case of the small, covered area. It was admitted that actual operating data are at present very scarce, but details of experience with a number of plants during the coming year were promised.

(2) The author advocated that the designing engineer include in the first cost of plant all necessary tools and such auxiliary equipment as portable sludge pumps, pointing out that such equipment is easy to secure at the time of the general outlay of money for construction, but that the operator would usually have considerable difficulty in securing appropriations for such purposes at a later time. The meeting thought so well of this suggestion that a committee was appointed to decide on appropriate equipment which the State Board of Health should require to be designated for each new plant for which plans are hereafter submitted.

(3) Digestion as a method of disposing of activated sludge was advocated, it being pointed out that the fuel value of the gas is decidedly greater than the fertilizer value of the organic matter used in its production, and there is no question of a market for the gas as it can be conveniently used for power at the plant. Mr. Gavett showed how 15% of the total power used at one plant could be so provided.

(4) He advocated the preparation of a pamphlet on the use of sewage sludge as fertilizer, in order to prevent unfortunate experiences by farmers unaccustomed to its use, which might prejudice neighbors against its use. Issuing of such information was provided for by resolution of the meeting.

Chief Engineer H. P. Croft of the State Department of Health spoke on the operation of the Operator's Licensing Law. While it has been found in practice that the law did not have the teeth whcih it had been expected to develop, its moral effect during the past four years had been very satisfying to the Board, being of material aid in stabilizing the operating forces of the various plants. Two amendments to the law were referred to a committee to be placed before the legislature. The first provides the missing teeth, and the second requires municipalities to pay wages and expenses to operators when they are called to Trenton for conference or instruction by the State Board.

Engineer Chas. Nichols of the Department spoke of the use made of the monthly operating sheet which all operators are required to turn in. This paper was a masterpiece of diplomacy, drawing the attention of the operator to the benefit to himself of having a complete and accurate record on file with the Board in case of local criticism of operation or in case it became necessary to apply the provisions of the License law to prevent unwarranted removal of the operator.

Paul Molitor of Chatham gave a highly interesting account of the failure of a deep tile sewer 24 inches in diameter. The paper and subsequent discussion developed the following points: The interior of the pipe (surface) showed no effect of its 30 years service. The unbroken part of the line showed perfect grade, alignment and joint work. The failure was attributed to (1) unsuitable foundation, (2) overloading of sewer, (3) impact strain from heavy traffic on uneven, hard, pavement, (4) cover load. Discussion showed that not much weight was given to consideration of the cover load factor, it being pointed out that under modern traffic conditions a deep sewer was safer than a shallow one, since the impact would be dissipated as the depth increased. In this connection, however, the author pointed out that while he was inside the pipe, inspecting it, impact shock from heavy traffic on rough pavement was very noticeable even at the depth of 20 to 22 feet. Detailed report of the inspection suggests a combination of factors (1) and (2) as the primary cause of failure. A considerable section of the downstream portion of the line was undamaged, many feet of the next section above showed a continuous logitudinal crack at top and bottom of the pipe, while the upstream section showed complete collapse with cracks at the quadrant points. From this section many yards of sand and gravel had to be removed by means of sewer cleaning scoops before inspection could be made. The above conditions suggest the blowing out of joints by overloading, consequent scouring of the adjacent earth allowing settling of the line, and return of the liquid to the line accompanied by sand and gravel through the open joints during the succeeding minimum flow period. Friction and relief in this upper part of the line temporarily saved the lower portions, the destruction of which proceeded down stream progressively.

The meeting accepted the majority report of the committee on changing the name of the Association to one of national scope, which report was adverse to the change and the proposition was dropped.

A movement was started looking to the establishment of an extension course at Rutgers College in sewage plant management. This course would be under the engineering division of the college and practical operators and State board of health engineers would would be called in as lecturers. A committee was appointed to take up this matter.

The officers elected for the coming year were as follows: President, J. H. Coe, of Englewood, N. J.; first vice-president, H. M. Beaumont, of Philadelphia; second vice-president, Paul Molitor, of Chatham, N. J.; treasurer, R. W. Lindsay, of Lyndhurst, N. J.; secretary, John R. Downs, of Bound Brook, N. J.

Dr. Wm. Rudolfs closed the program with a progress report of the work of the experiment station, most of which is available in the latest annual report. (See Public Works for March, pages 101-105.) The broadside of questions fired at Dr. Rudolfs indicated the keen interest taken in the work of the laboratory. Further evidence of the public confidence in the work of the laboratory was indicated by the announcement that the Chemical Foundations Corporation had endowed it with $1,000 a year, and the Dorr Company had given $2,000 for a year's investigation of certain phases of sewage disposal.

The meeting closed after the unanimous passing of resolutions thanking those two organizations for their generous support of the work of the Experiment Station.

ASSOCIATION OF HIGHWAY OFFICIALS OF THE NORTH ATLANTC STATES

The first convention of this association was held in Atlantic City on February 25 to 27, with nearly a thousand in attendance, including guests and those having exhibits. The officers elected were as follows: President, William G. Sloane, of Trenton, N. J.; vice-president, Paul D. Sargent, of Augusta, Me.; secretary-treasurer, A. Lee Grover, of Trenton, N. J.

Among the papers read were the following: "State Highway Departments—their organization, duties and responsibilities," by W. M. Acheson; "Traffic and its effect on highway maintenance," by Paul D. Sargent; "Development of new arterial highways for handling traffic in congested areas," by Fred Lavis; "Factors affecting efficiency in construction organization and the influence of specification interpretation on unit costs," by T. J. Wasser; "Arlington tests on subgrade treatment and their relation to rigid and non-rigid type pavements," by A. T. Goldbeck and, by the same author, "Conclusions drawn from the Arlington service test and their relation to pavement design"; "A comparison of the Illinois section with typical sections of the Eastern states," by H. E. Breed; "Factors determining the necessity and methods of reconstruction," by W. H. Connell; "Trend in bituminous pavement design for heavy traffic," by Prevost Hubbard; "Late developments in the design and maintenance of bituminous macadam pavements," by J. S. Crandall; "Economic value of grade and alignment on heavily traveled roads," by E. W. James.

AMERICAN CONCRETE INSTITUTE

This society held its 21st annual meeting at Chicago February 24th to 27th. There were eight sessions for discussions, during which seventeen committees reported, ten of them chiefly progress reports only. There were practically no new suggestions for specifications but chiefly recommendations that those formerly adopted tentatively be definitely adopted now as standard.

ASSOCIATED GENERAL CONTRACTORS

The Associated General Contractors of America made public on February 26th resolutions that bring to light a bitter industrial controversy over present practises in writing surety bonds. Investigation by state legislatures and creation of laws to rid the construction industry of dishonest and incompetent bidders who now receive bonds is unanimously urged by representatives of a number of organizations which united in the construction industries conference on surety bonds. These organizations are the Associated General Contractors of America, American Institute of Consulting Engineers, American Society of Civil Engineers, American Institute of Architects, American Society of Mechanical Engineers, American Society for Municipal Improvements and nationally organized manufacturers of construction equipment and materials.

These resolutions state that "certain practices attached to the writing of construction surety bonds are subversive to the best interests of the public, which ultimately pays for all construction." "Careful study and investigation show that irresponsibility and inexperience have been greatly encouraged and increased by careless methods in contract bond writing and three years of effort have failed to secure any definite reform." The conferees express themselves as of the opinion that "the surety companies can correct the improper practices admitted to exist."

Among the recommendations made by the conference are: A legislative investigation of present methods, legislation in the various states prohibiting the use of certified checks furnished or guaranteed by an underwriter and providing the substitution of certified checks for bid bonds and acceptance of bankable securities; the adoption of a comprehensive, uniform questionnaire covering skill, integrity and responsibility to be submitted by all bidders; a change in the methods of compensating agents to one which will take into consideration successful completion of the contract; an agreement between surety companies for placing the collection of information, verification of experience, character and performance records, financial statements, etc., in the hands of some agency which does not participate in premiums; state legislation making it unlawful for any public official or employee to receive payment from a surety company in connection with placing a bond through a particular underwriter company; a clause in every surety bond providing for arbitration of disputes between owners and underwriters; elimination of all so-called free service to bidders by underwriters prior to the filing of a bond.

OHIO ENGINEERING SOCIETY

The Ohio Engineering Society at its annual meeting in February elected as president, George F. Schlesinger; as vice-presidents, John W. Graham and W. C. Fawcett, and as secretary-treasurer, Carl L. Van Voorhis.

WISCONSIN ENGINEERING SOCIETY

The Wisconsin Engineering Society at its annual meeting in February elected the following officers for the coming year: President, Alva L. Hilles; vice-president, Clarence M. Baker; secretary-treasurer, Leonard S. Smith; trustees, William G. Kirchoffer and Garret E. Heebink.

NEW ENGLAND WATERWORKS ASSOCIATION.

At the March meeting of this association Diesel engines were the subject of discussion, there being three papers—"The Diesel Engine and Its Over-All Efficiency," by C. B. Jahnke, of Fairbanks, Morse & Co.; "Diesel Engine Experience in a Pumping Plant," by

(Continued on page 62)

PERSONALS

Filby, E. L., sanitary engineer of the South Carolina State Board of Health, has resigned to become director of the Bureau of Sanitary Engineering of the state of Florida.

Simons, George W., Jr., has resigned the positon of state sanitary engineer of Florida to enter private practice.

Janda H. F. has been appointed assistant director of the Highway Research Board of the National Research Council. He was for two years assistant city engineer at Portage Wis., and has been assistant professor of civil engineering at the University of Cincinnati and associate professor of highway engineering at the University of North Carolina.

Thompson, Lindse E., formerly sales manager of the National Sewer Pipe Co., is now field engineer of the Illinois Paving Brick Manufacturers Association with headquarters in Webster City, Iowa.

McGeehan, Paul, at one time engineer in charge of the sewer division of Kansas City, Mo., has been appointed city engineer of that city.

Holway, W. R., has been appointed consulting engineer for the Oklahoma State Board of Health.

Webster, J. H., Jr., surveyor in the Bureau of Surveys, Philadelphia, since 1881 has resigned that positon. He continues as member of the board of engineers of the Delaware River bridge.

Brown, Charles A., formerly assistant city engineer of Indianapolis, has resigned and opened an office for private practice.

Sackett, Arthur J., has withdrawn from the firm of Mason & Hanger Company, Inc., and is associated with The Mason Company, Inc., general contractors, as vice-president and general manager.

Hitchcock, L. B., has been appointed city manager of Phoenix, Ariz. Mr. Hitchcock was city engineer of Phoenix a few years ago.

McCormick, Robert H., who was city engineer of Detroit, from 1898 to 1916, died on February 22nd, age 72 years.

Loomis, Horace, for more than forty years connected with the engineering department of New York City, died on March 8th, age 85 years. At the time of retiring in 1914 he was consulting engineer to the Bureau of Sewers.

Page, Frank, formerly chairman of the North Carolina State Highway Commission, has been reappointed to that position for a term of six years.

Brower, Irving C., formerly city manager of Pontiac, Mich., has been appointed city manager of Lima, Ohio.

Taylor, William G., formerly consulting engineer on trade wastes and sewers for the city of Paterson, N. J., has been made city engineer and street commissioner of that city.

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

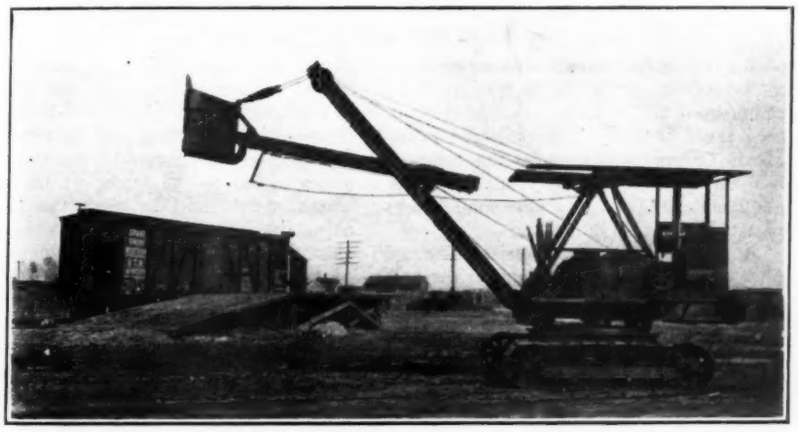
THE NEW SPEEDER SHOVEL

The Speeder Machinery Corporation, Fairfield, Iowa, have developed a half yard shovel to go with their light crane.

This shovel is of one half yard capacity and has been built to meet the popular demand for a light, inexpensive shovel for basement and other small jobs.

The shovel is so constructed that it is not necessary to make any changes in the machine other than to remove the crane boom and bolt the shovel boom on. A reversible cable crowd is used.

The drums on the "Speeder Crane" are so constructed that it is not necessary to make any change in them in changing from crane to shovel equipment. This machine may be also used as a drag-line without any additional changes, as there are three main drums and a boom hoist drum.



NEW SPEEDER SHOVEL.

SCHRAMM AIR COMPRESSORS

Schramm, Inc., of West Chester, Pa., has just placed on the market a new type of air compressor which is built in two sizes, with piston displacements of 120 and 165 cu. ft. per minute, respectively.

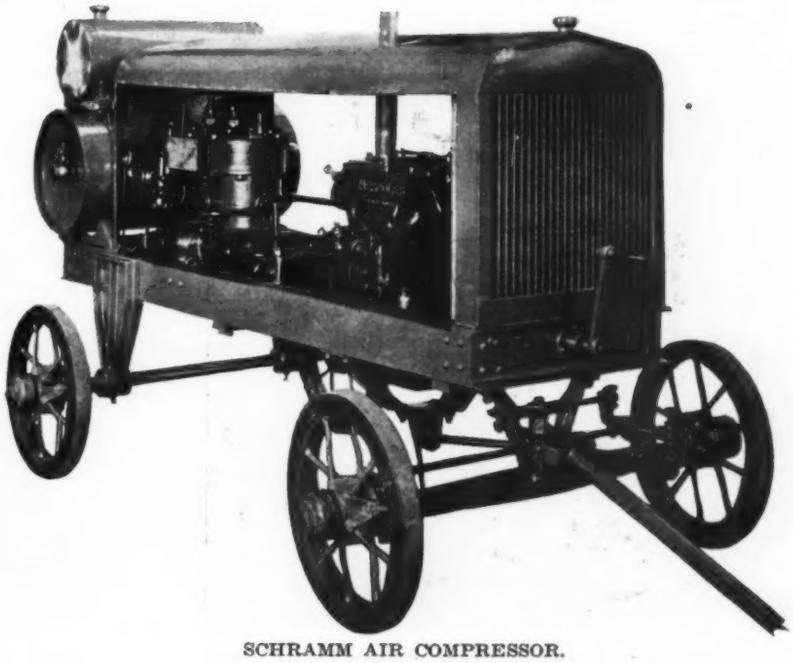
Both sizes use four-cylinder, vertical, L-head, heavy duty, gasoline motors, direct connected to a two-cylinder, vertical compressor. Both engine and compressor are mounted on a heavy, one-piece steel channel frame with air tank, gasoline tank and all fittings.

The entire assembly is mounted on a truck with broad-faced steel wheels as standard equipment. Rubber-tired wheels can also be supplied when desired. Both engine and compressor with all control apparatus are entirely covered with a steel housing, the sides of which can be removed when the outfit is operated.

Engine and compressor on both the and fan of sufficient size to keep the the outfits being equipped with radiator engine and compressor working at the No. 120 and No. 165 are water-cooled, highest efficiency at all times. A water pump further insures cool water being forced through the cylinder water-jackets of both engine and compressor.

The engine is equipped with a high-tension impulse starter which makes starting positive and easy. To further insure easy starting, a heavy clutch has been placed between the compressor and engine in order that the engine may be started separately from the compressor. In starting, this allows the engine to come up to speed before the compressor load is thrown on and prevents stalling of the motor and makes re-cranking unnecessary. The clutch also facilitates starting in cold weather.

Contractors, iron and steel erectors, state and county highway officials will find them particularly suited for handling a battery of rock drills, paving breakers, reamers, steel and woodboring tools and the many other pneumatic tools used in the contracting and construction fields.



SCHRAMM AIR COMPRESSOR.

TOPPING PONY DITCHER

The Charles T. Topping Machinery Company of Dayton, Ohio, manufacturing a pony ditcher (described in Public Works for March, 1923) and announces several mechanical improvements in their 1925 model. A power-operated hoisting mechanism automatically raises and lowers the excavator boom, this standard equipment having been substituted for the hand-operated mechanism heretofore furnished. Three different lengths of boom are now available, enabling the machine to excavate to a depth of 4½, 5½ and 6½ feet, respectively, and up to widths of 25 inches. The pony ditcher is provided with thirty-six forward traction speeds, twelve of which are suitable for excavating and provide digging speeds ranging from 50 feet an hour to approximately 500 feet. The speeds for road traveling range up to about 3½ miles per hour, with six reverse traction speeds. The ditcher is provided with a cross conveyor which is reversible so that excavations may be deposited at either side as desired.

The makers claim that this ditcher is capable of excavating practically any class of material that can be excavated with pick and spade, even such materials as macadam.

The pony ditcher is mounted on a standard Fordson tractor, and this is done at the factory or the mounting may be done by a Ford dealer, through whom it can be ordered.

HELTZEL BATCH BOXES

The Heltzel Steel Form & Iron Company of Warren, Ohio, manufactures batch boxes with all-steel construction, all top edges reinforced with double steel flanges, thus affording absolute rigidity and providing permanent holes for easy handling. The boxes are riveted throughout but none of the rivets are inside the box, the bottom being made in one piece, smooth and seamless. The steel construction permits of a fire being built under the box in cold weather to keep the materials from freezing.

The boxes are made in three sizes, 5 ft. by 2 ft. 4 in., 7 ft. 6 in. by 3 ft. 6 in., and 11 ft. 6 in. by 4 ft. The first two are made of 14-gauge steel and the third of 12-gauge. They weigh 80 pounds, 140 pounds and 350 pounds, respectively. Either size can be furnished with a steel saddle to which is bolted a hod support which slides along the side of the box to any location desired.

NEW BLAWNOX BATCHER PLANT

The Blaw-Knox Company, of Pittsburgh, has introduced some new features in its 1925 design of batcher plant, one of the most striking being the folding legs. When the plant is shipped by rail, it is loaded entirely assembled except for the batchers. It is trucked from the train to the job and adjusted by simply straightening the legs, which are hinged and folded up during shipment. The batchers are then attached, four braces are bolted in place (eight bolts only being used) and the plant is then ready for service.

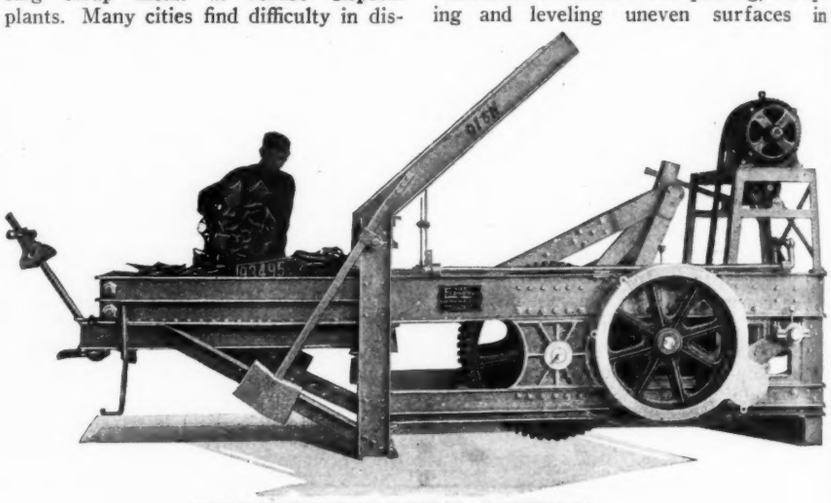
When it is to be moved from one place to another by truck the truck is driven under the plant, the legs folded up, and the plant, batchers and all, is taken to the new location.

These small batcher plants are made in 18 and 39-ton sizes, the material being figured at 110 pounds per cubic foot.

ECONOMY BALERS.

The Economy Baler Company, of Ann Arbor, Mich., manufactures baling presses of various kinds, some of which are especially appropriate for compressing scrap metal at refuse disposal plants. Many cities find difficulty in disposing of bulky metal wastes, such as cans, buckets, etc., while, if they could be compressed so as to be readily shipped, they could be sold. The No. 1218 Scrap Metal Compress shown by the cut will bale tin cans, old tin roofs, eave troughs, automobile bodies, etc., into solid blocks measuring 10x14x18 inches.

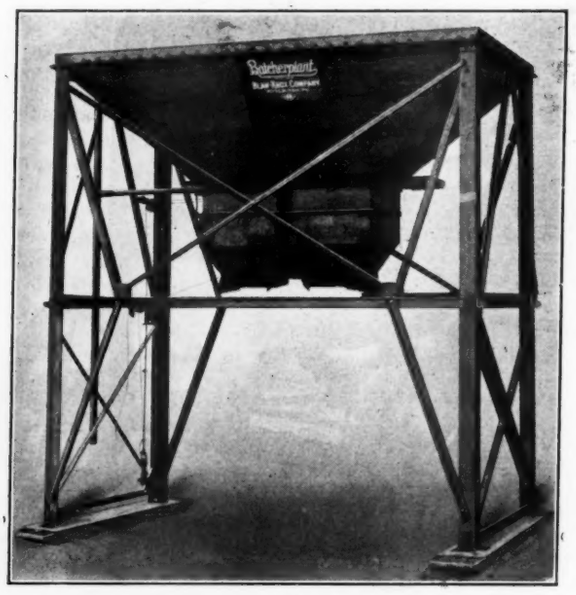
A plunger operating horizontally applies a pressure of 1,000 tons to the bale from all sides at once, reducing it to a solid block that will stand rough handling and weighs approximately from 75 to 100 pounds. The machine is controlled by one lever, accessible from either side, and the compression box is easily loaded from either side. With its directly connected electric motor, the baler is a complete unit requiring no special foundation. If desired, it can be set on rollers and moved along under a line of overhead bins. The power is developed by gears under a dustproof hood. There is an automatic shutoff that stops the press instantly when a certain predetermined pressure is reached.



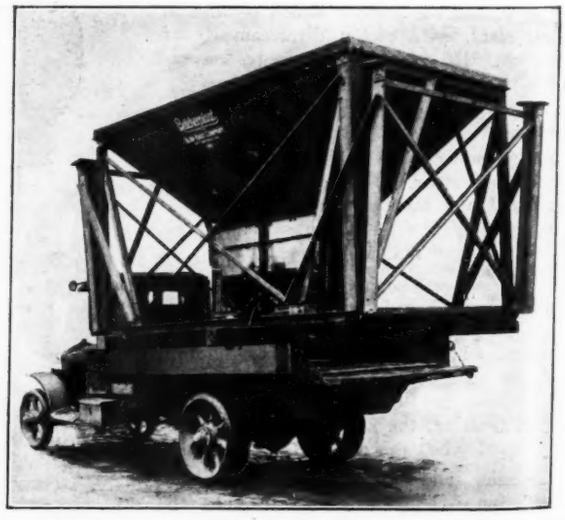
ECONOMY SCRAP METAL COMPRESS.

MONARCH ROAD PLANER.

Edw. J. Jackoboice, of Grand Rapids, Mich., manufactures the Monarch road maintenance machine for planing, scraping and leveling uneven surfaces in gravel and dirt roads. It may be attached to any motor truck and adjusted to any angle. The blade is 5-16-inch by 10 inches by 10 feet and is reversible. The planer is supported by means of iron plates bolted to the frame of the truck. These plates hold in place the upright adjustable spindle or hanger which carries at its lower end a horizontal box or bearing, through which passes a 4½-inch steel tubular shaft, to which are attached the spring units for holding the blade to its proper position on the road. The blade is raised and lowered by worm gear operated from the driver's seat, which is self-locking in every position. A connecting rod enables the operator to set the cutting blade firmly and steadily to the position best adapted to securing an evenly surfaced road. When not in use the blade can be raised to clear the road fully 8 inches.



PORTABLE CHARGING BIN, 18 TONS CAPACITY, WITH FOLDING LEGS.



SAME BIN, WITH LEGS FOLDED UP, LOADED ON TRUCK.

28 day concrete-in 24 hours

LUMNITE

saved Allegheny County, Pa., three weeks' interruption of traffic

DURING the summer of 1924 a very sudden and heavy rain storm washed out an embankment and two 24-inch pipe culverts under the Cliff Mine Road, a highway carrying a good deal of both rapid and heavy traffic. The washout was at a dangerous point, at the bottom of two grades and at a turn.

The engineer in charge stated that from 3 to 4 weeks were saved by using Lumnite. Had ordinary concrete been used the contractor would have been compelled to wait at least 2 weeks after completing one-half the work before he could even begin on the other half.

Atlas Lumnite Cement is a hydraulic cement that develops greater strength at 24 hours than that developed by other building cements at 28 days. It is mixed and handled in much the same manner as Portland Cement and allows the normal time required for mixing and placing in forms. It can be used in colder weather than other cements.

For every type of reinforced concrete, for street and road construction and repairs, for bridges and culverts, floors, railroad construction and maintenance, machinery foundations, mines, oil wells, sewers, conduits, and concrete products—Lumnite will effect big economies in time and money.

THE ATLAS LUMNITE CEMENT CO.

25 Broadway, NEW YORK CITY

2000 First Ave., Birmingham, Ala. 134 So. La Salle St., Chicago, Ill.

✓ *and mail this coupon* TODAY

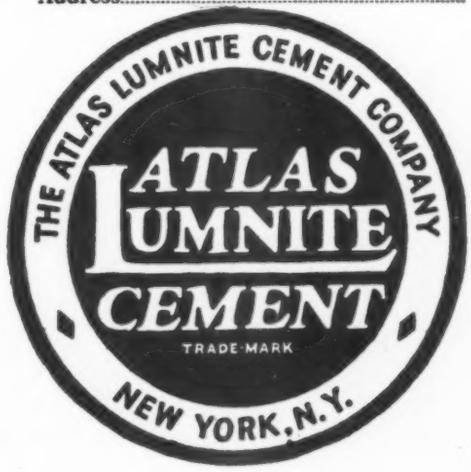
Please send your booklet on Lumnite, also detailed information on Lumnite's use for the work checked.

- Beams ☐
- Bridges ☐
- Building Alterations ☐
- Concrete Products
  - (a)—Fence Posts ☐
  - (b)—Reinforced Pipe ☐
  - (c)—Reinforced Posts for mail boxes ☐
  - (d)—Roofing Tile ☐
  - (e)—Septic Tanks ☐
- Conduits ☐
- Culverts ☐
- Curbs ☐
- Dams ☐
- Drill Borings ☐
- Emergency Repairs in case of washouts, landslides ☐
- Entrance Ways ☐
- Floors ☐
- Foundations
  - (a)—Building ☐
  - (b)—Derrick ☐
  - (c)—Engine ☐
  - (d)—Machine ☐
- General Reinforced Concrete ☐
- Girders ☐
- Grouting Granite Blocks ☐
- Gutters ☐
- Highway Intersections ☐
- Industrial Roadways ☐
- Mines
  - (a)—Bulkheads ☐
  - (b)—Flumes ☐
  - (c)—Retaining Walls ☐
  - (d)—Roof Supports ☐
  - (e)—Shaft Linings ☐
- Oil Wells ☐
- Piers ☐
- Railway Construction and Maintenance
  - (a)—Bridge Approaches ☐
  - (b)—Bridge Piers ☐
  - (c)—Bridge Seats ☐
  - (d)—Platforms ☐
  - (e)—Roundhouses ☐
  - (f)—Track Base and Filling In ☐
  - (g)—Turntable Construction ☐
- River and Harbor Construction ☐
- Sewers ☐
- Street and Road Paving and Repairs ☐
- Subways ☐
- Tunnels ☐
- Underpinning ☐
- Water Works and Drainage System ☐

5

Name.....

Address.....



NEW INDUSTRIAL CRANE.

The Industrial Works, of Bay City, Mich., has recently begun production of a crawling tractor crane. This is a 10-ton crane known as Type DC, and is quite similar in outward appearance to the cranes previously built by that company, but the design embodies several new features, such as split gears for propelling, increased speeds, double clutch mechanism, unusually long tractor belts, which are claimed to make it the fastest, simplest and sturdiest type yet produced, yet economical to operate.

INDUSTRIAL CRAWLING TRACTOR CRANE.

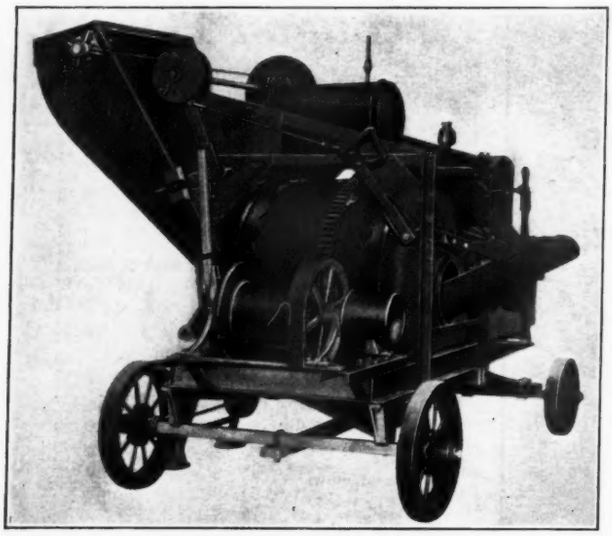
The manufacturers consider the most important feature to be the split gears, by which each tractor belt is separately controlled. Each belt is absolutely controlled by powerful friction clutches and brakes. The drive is all gear from engine to sprockets, with no chains whatever.

All speeds of the motor-operated crane have been increased 25 per cent. The distance between centers of the two end sprockets is 10 feet, giving great stablity and support for a large range of operation.

The crane can be operated with a steam engine, electric motor, gasoline motor or fuel oil engine of the Diesel type. It can operate with a clamshell or dragline bucket, hook and block or grapple. It is readily convertable into a shovel or a pile driver.

LANSING MIXERS.

The Lansing Company, of Lansing, Mich., aims in its mixer to reduce vibration to a minimum in its 7-S and 14-S mixers. This is attained chiefly by placing the center of gravity of the machine as low as possible. In addition, the machine is mounted on a rigid, heavy frame and axle, the frame being hot-riveted together and amply cross-braced.



LANSING CONCRETE MIXER.

To insure smoothness of action of blades and buckets, the drum tracks are machined to perfect circles, and especial care is taken in mounting the drum on the rollers, the rollers on the trunnions and the trunnion shafts on the frame. The Trunnion bearings are mounted directly on the under side of the frame, giving the low center of gravity.

Another contribution to smooth operation is the internal expanding Raybestos lined hoisting clutch with automatic release and brake when the skip reaches the 50-degree discharging angle.

BAY CITY ONE-MAN EXCAVATOR

The Bay City Dredge Works of Bay City, Mich., is offering this year Model 4 of its one-man excavator which contains improvements over this machine as previously manufactured by them.

The company announces the following as being the improvements in this new model:

Can be changed from shovel to clamshell or dragline in an hour's time without changing boom or machinery arrangement.

Shovel capacity increased to ½-cubic yard.

Heavier dipper without bale and with cast-steel back.

Back and pinion cable operate crowd.

All-steel framework.

Silent chain drive.

Bull wheel swing same type as used on larger Bay City 16-D.

Caterpillar treads increased in length.

Hercules power unit.

Greater ground clearance.

BAY CITY ONE-MAN EXCAVATOR.

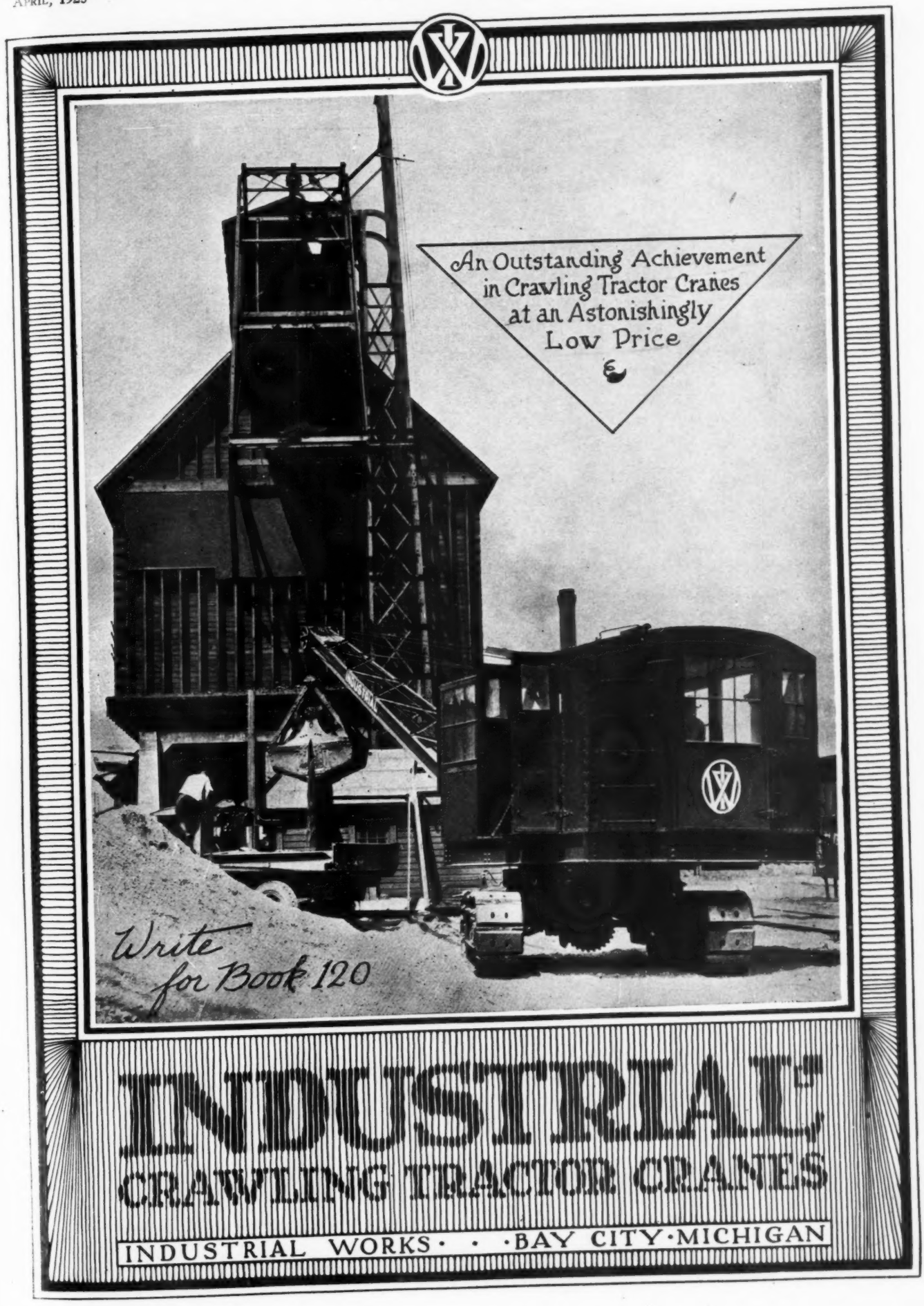
JOHNSON TRACKPULL.

The Belle City Mfg. Company, of Racine, Wis., manufactures a "trackpull" attachment for a Fordson tractor which it claims doubles the draw-bar pull of the tractor and makes it exceptionally efficient for tough plowing, road grading and other heavy work. Each section of the crawler consists of two links, two pins of the floating type, and a hot-forged and hardened shoe.

THE JOHNSON TRACKPULL

It is a multiple disc clutch controlled and there is no strain upon the differential. Two clutches located in the rear sprockets operate independently, enabling the tractor to turn in its own length.

The length of track on the ground is 50 inches, width of shoe 10 inches. The track rollers and bearings throughout are dustproof. The shipping weight is 2,500 pounds.


An Outstanding Achievement
in Crawling Tractor Cranes
at an Astonishingly
Low Price
Write
for Book 120
INDUSTRIAL
CRAWLING TRACTOR CRANES
INDUSTRIAL WORKS · · BAY CITY · MICHIGAN

FLY BALL GOVERNOR.

The Wehr Company, of Milwaukee, Wis., has placed on the market a new Model M Fly-Ball governor for Fordsons. Two high-grade ground ball-bearings carry the governer's revolving parts. The thrust bearing also is a high type

FLY-BALL GOVERNOR

ground ball-bearing. The case is oil-tight and all parts run in a bath of oil. Installing this governor on a Fordson does not require a single change in the Fordson, but it is bolted in place by two bolts and the throttle connection is attached with two screws already provided on the Fordson.

UNIVERSAL FLEXIFOUR ENGINE.

The Universal Motor Company, of Oshkosh, Wis., manufactures a 4-cylinder, 5-10 horsepower industrial engine which it calls the "Flexifour." It is a 4-cycle engine of 2⅝-inch base and 4-inch stroke. The cylinder head is of the Ricardo type, the governor of the centrifugal type, the lubrication system is combination spray and splash and the ignition is high tension Bosch.

BUHL AIR COMPRESSOR.

The Buhl Company, of Chicago, Ill., has just put out a new air compressor unit consisting of a vertical hopper cooled twin cylinder compressor, tank and all fittings mounted on a U-shaped cast steel frame which connects with the axle housing of the Fordson, giving rigidity but allowing for a vertical motion. The trailer wheels are knuckled and connection is made to the steering mechanism of the tractor, permitting both tractor and compressor to be turned as a unit body and thus permitting permanent belted connection to be maintained.

BUHL AIR COMPRESSOR

The power is a Fordson tractor. The motor is mounted in a built-up channel frame and can be taken out of the roller frame and remounted as a regular tractor in a short time. It carries attachments of leveler and scraper and scarifier as well as picks for the roller wheels.

INDUSTRIAL NOTES

T. L. SMITH COMPANY REPRESENTATIVES

The T. L. Smith Company of Milwaukee announces the appointment of the following representatives: Hubbard-Floyd Company, Inc., of Lexington Ave., New York City for the New York territory; Herbert C. Legg of Phoenix, Ariz.; The Standard Building Supply Company of Shreveport, La.; The Dixie Culvert Manufacturing Company of Little Rock, Ark. Each of these will carry in stock a full supply of mixers and parts.

READING IRON COMPANY

The Reading Iron Company of Reading, Pa., has appointed R. I. Fretz to take charge of marketing the boiler tubes manufactured by the company in the plant which it has recently rebuilt. Mr. Fretz has represented the Bethlehem Steel Company and the Midvale Steel & Ordnance Company for a number of years and has been a student of metallurgy and metallography. His headquarters are in the general office of the Reading Iron Company at Reading.

LINK-BELT SKIP HOISTS

The Link Belt Company of Chicago has just issued a book explaining the many uses to which the skip hoist may be applied in handling materials. The text explains fully the function of the skip hoist and its relation to other types of mechanical equipment; tells where and on what classes of work Link-Belt skip hoists are being used and gives complete details of operation, capacity, design and construction. The book is well illustrated with drawings and photographs showing installations of various types. Copies may be obtained by interested engineering and production executives by addressing the nearest office of the Link Belt Company.

THE MONARCH CUB ROLLER

The Good Roads Machinery Company of Kennett's Square, Pa., has issued a new bulletin describing the Monarch Cub Roller, with illustrations and specifications. According to this bulletin, "because of its economy, convenience in handling and small cost of operation, the Monarch Cub Roller will appeal to the road official or contractor who does but a small amount of work, as well as to those who carry on large operations."

NEW READING REPRESENTATIVE

The Reading Iron Company of Reading, Pa. has added to its sales force Allan M. Cullum, who entered the company's mills two years ago on graduating from the Yale Scientific School. His headquarters will be at the general office of the company in Reading.

LIME MORTAR

The National Lime Association of Washington, D. C., has issued a pamphlet, "The Binder in Your Wall," in which it discusses the various advantages of mortar for laying up walls, treating of plasticity, strength, economy, proportions used in mortar and specifications for mortar; also the subject of mortar colors, effervescence, etc.

INDUSTRIAL WORKS.

Lyle Marshall, formerly sales manager of the Service Department of the Industrial Works, Bay City, Mich., and later in the Chicago office of that company, has recently been appointed district sales manager, with new offices at 619 Dixie Terminal Building, Cincinnati.

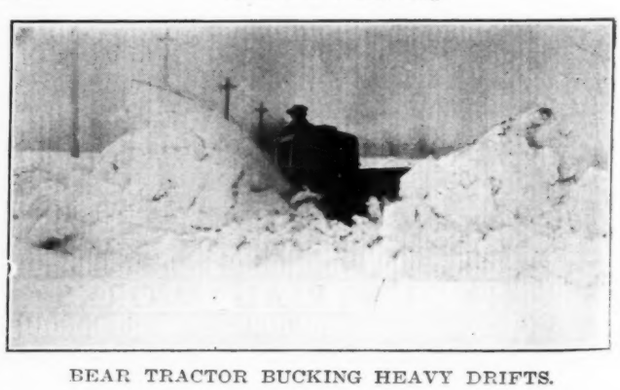
James E. Shearer, assistant sales manager, has moved his headquarters from the home office to a New York office at 50 Church Street.

NORTHERN CONVEYOR AND MANUFACTURING COMPANY.

The Northern Conveyor & Manufacturing Company, of Milwaukee, Wis., builders of portable conveyors, will move to Janesville, Wis., on or about June 1. Here a new plant with triple the present capacity will be housed in a modern factory building with about 32,000 square feet of floor space. The transfer was arranged for by the Janesville Chamber of Commerce. J. B. Whitnall, president of the company, states that the business has outgrown its Milwaukee plant.

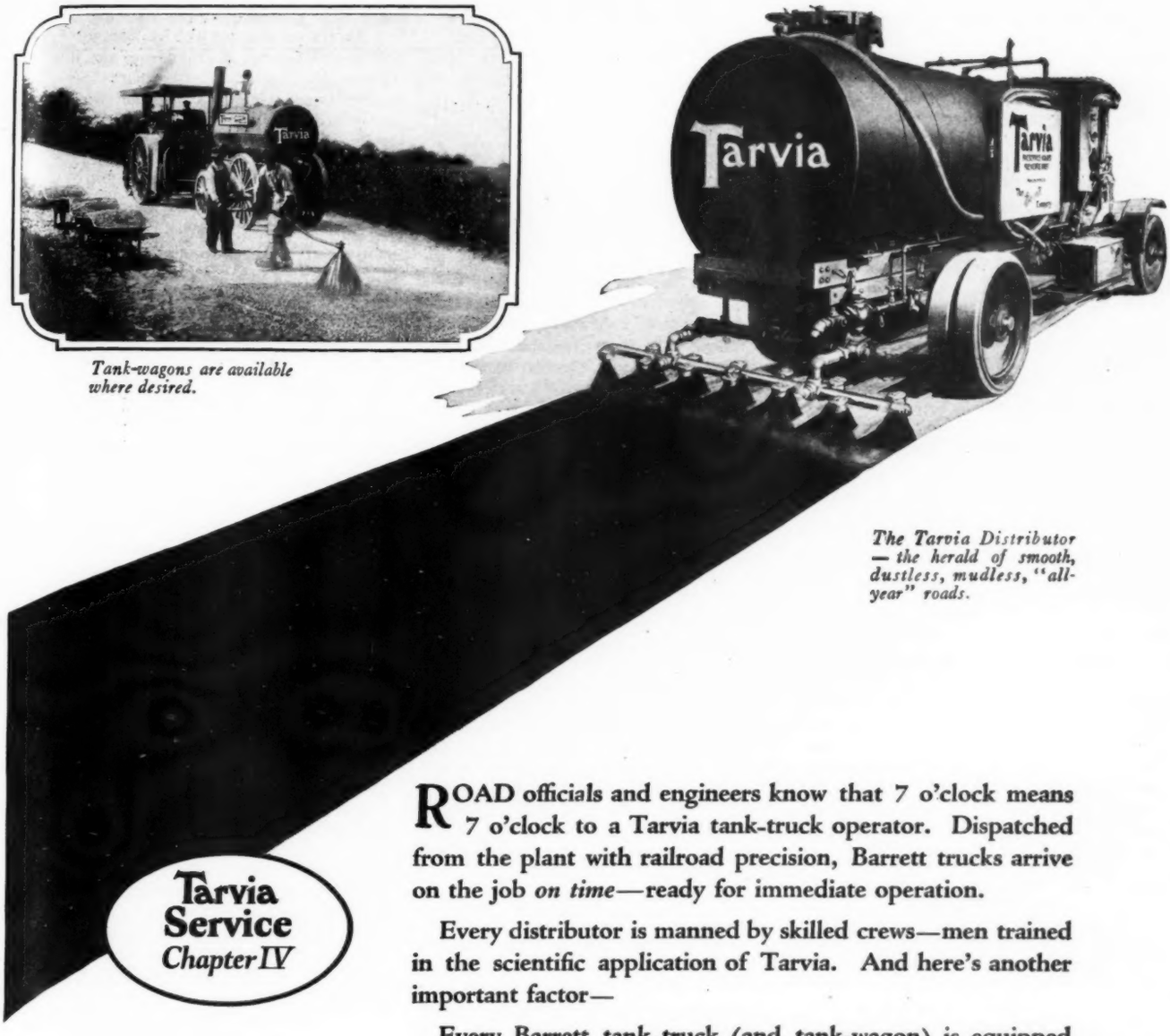
BEAR TRACTOR AS A SNOW FIGHTER.

The Bear tractor, made by the Mead-Morrison Mfg. Company, of East Boston, is said to have given excellent service last winter in unusually strenuous work of keeping the snow cleared from King Edward Highway, the main auto route between Montreal and northern New York. In some cases it was necessary for the plow attached to the tractor to push aside snow that buried it from 6 to 8 feet deep.



BEAR TRACTOR BUCKING HEAVY DRIFTS.

Tank-wagons are available where desired.



The Tarvia Distributor — the herald of smooth, dustless, mudless, "all-year" roads.

Tarvia Service *Chapter IV*

ROAD officials and engineers know that 7 o'clock means 7 o'clock to a Tarvia tank-truck operator. Dispatched from the plant with railroad precision, Barrett trucks arrive on the job *on time*—ready for immediate operation.

Every distributor is manned by skilled crews—men trained in the scientific application of Tarvia. And here's another important factor—

Every Barrett tank-truck (and tank-wagon) is equipped with the famous Barrett nozzle—a patented feature—which insures the uniform, unbroken distribution of the Tarvia.

Tarvia tank-truck delivery is available where the size of the program justifies it — and on smaller jobs which are located near our factories.

Today, throughout the length and breadth of the United States, the Tarvia truck is justly recognized as the symbol of efficient road construction service.

Tarvia

For Road Construction Repair and Maintenance

The Barrett Company

New York	Chicago	Philadelphia	Boston
St. Louis	Cleveland	Cincinnati	Pittsburgh
Detroit	Kansas City	Birmingham	Dallas
Minneapolis	Salt Lake City	Bethlehem	Lebanon
Youngstown	Milwaukee	Toledo	Columbus
Baltimore	Syracuse	New Orleans	Rochester
Providence			Buffalo

In Canada:

THE BARRETT COMPANY, Limited

Montreal	Toronto	St. John, N. B.
Winnipeg	Vancouver	Halifax, N. S.

BLAW-KNOX CATALOGUES.

The Blaw-Knox Company, of Pittsburgh, Pa., has issued two new catalogues, one on "Road-Building Equipment," describing the company's road forms, measuring batchers, steel beams, batcher plants, buckets, turntables and steel buildings; the other describing "Railroad Buckets," the dreadnought bucket and the single-line bucket.

BLUEPRINT PRIZE ESSAY.

The C. F. Pease Company, of Chicago, is offering a prize for the best advertising slogan for the blueprinting industry, accompanied by a letter explaining why that particular slogan is suggested. Anyone may contest. The contest closses June 15. Instructions may be obtained from and slogans sent to Chairman Blueprint Slogan Contest, The C. F. Pease Company, 813 North Franklin Street, Chicago, Ill.

THE LEADITE COMPANY.

The Leadite Company of Philadelphia, Pa., announces that J. M. Diven, Jr., who was formerly with the Kelly Well Company, of Grand Island, Nebr., has joined the sales organization of the Leadite Company.

LINK-BELT LOADER PRICES.

The Link-Belt Company, of Philadelphia, announces a price reduction on Type C portable bucklet loader and the Cub portable belt conveyor to $475 f.o.b. Chicago or Philadelphia. The machines are furnished complete with two or three-phase, 60-cycle alternating current motor. The reduction in prices is made possible by quantity production.

HARNISCHFEGER CORPORATION NEW BRANCH OFFICE.

The Harnischfeger Corporation, of Milwaukee, announces the location of a new branch office at Birmingham, Ala., 431 First National Bank Building, which will be in charge of James Van Buskirk, who was transferred from the Detroit office of the company. The Detroit office, 452 Book Building, will be in charge of H. E. Mensch.

BRAY SLAG BRICK.

The Bray Slag Brick Company, of Salt Lake City, Utah, is prepared to furnish at its plant at Midvale, Utah, slag brick in any quantity desired. Midvale is one of the largest ore smelting districts in the world, and slag brick is made from slag obtained from the furnaces in the vicinity. The company has explained the advantages of slag brick in a pamphlet which will be furnished on application.

NATIONAL PAVING BRICK MANUFACTURERS' ASSOCIATION.

The Board of Governors of this association, at its March quarterly meeting, elected for the ensuing year W. P. Whitney, president of the Springfield Paving Brick Company, as president, and reelected O. W. Renkert as chairman, C. C. Barr as treasurer, B. L. Beller assistant treasurer, Edward E. Duff, Jr., secretary, and Stanley A. Knisely assistant secretary.

The association has recently published large quantities of three pamphlets for advertising purposes, these being entitled "Brick Roads Outlast the Bonds," "Brick Pavements, City Streets and Country Highways" and "Making Brick Pavements." These pamphlets are finely printed on coated paper, well illustrated and with illuminated covers and will be furnished to engineers and others interested in brick roads.

FORGED STEEL PIPE FLANGES.

An 86-page catalogue with the above title has been issued by the American Spiral Pipe Works, of Chicago, Ill., and, with its abundant illustrations, formulas and tables, should be very informative and valuable for engineers and designers of power systems. In addition to flanges the catalogue describes plain and corrugated furnaces and welded pipe.

DAYTON-DOWD COMPANY.

The Dayton-Dowd Company, of Quincy, Ill., has recently opened a new office at 841 David Whitney Building, in charge of E. E. Maher and E. P. Johnson. The company has also appointed as new sales representative for the New England district the Power Equipment Company, of 131 State Street, Boston.

MARION MACHINE COMPANY EXPANDS.

The Marion Machine, Foundry & Supply Company, of Marion, Ohio, has purchased from the Swartwout Compaiy, of Cleveland, all the machinery, good will and patents covering Swartwout metal buildings. The machinery and equipment for manufacturing these buildings will be shipped at once to Marion, where they will be installed in a new building now approaching completion.

MANGANESE STEEL CASTINGS.

The American Manganese Steel Company, of Chicago Heights, Ill., furnishes pamphlets describing the use of manganese steel castings in a great variety of industries, including brick and cement manufacture, contracting, dredging, centrifugal pumps, sand and gravel industry, and, in fact, almost any kind of mechanical appliances subject to hard wear.

GARDINER & LEWIS.

At a meeting of the directors of Gardiner & Lewis, Inc., of New York City, on March 23, the name of the firm was changer to Lewis Asphalt Engineering Corporation. There will be no change in ownership, management or policy or in personnel, and the office will remain at 30 Church Street. There are principal offices at New York, Chicago and Cleveland and agents in all the other principal cities for the distribution of its asphalt derived specialties for structural protection.

NEWS OF SOCIETIES

(*Continued from page* 54)

Leonard C. L. Smith, and "Diesel Engine Experience in a Modern Forge Plant," by J. P. Harbeson, Jr. These papers were discussed by Samuel Agnew, Leonard Metcalf, R. H. Bacon and others.

There was also a superintendents' discussion of the question of "The protection of water pipes and appurtenances in exposed locations," there being two formal papers on the subject by Samuel E. Killam and George H. Finneran, and discussion by Charles W. Sherman, David A. Heffernan, George F. Merrill, Frank J. Gifford, Edward D. Eldridge, John Doyle and Melville A. Sinclair.

AMERICAN PUBLIC HEALTH ASSOCIATION.

This association announces that it can now furnish Transactions of the International Conference on Sanitary Engineering which was held in London last July. The principal subjects dealt with at the conference were: "State Sanitary Administration," "Works for the Prevention of Malaria and Yellow Fever," "Methods of Disposal of Sewage and Trade Wastes in Various Countries," "Treatment of Sludge Arising from the Agitation Processes of Sewage Disposal," "Fertilizing Value of Sewage Sludge," "Sewerage and the Control of Storm Water," "Design of Sedimentation Works," "House Sanitation," "Rufuse Collection and Disposal," "National Control of Water Sources" and "Water Purification." The book contains nearly 400 pages of the formal papers and discussions by leading engineers in many countries and is sold at $4.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

The fifty-fifth annual convention of this society will be held in Cincinnati April 22 to 24 at the Hotel Gibson. Among the papers to be presented is one describing the "Dix River Dam of the Kentucky Hydro-Electric Company," by L. F. Harza of Chicago. Of special interest to municipal officials will be the papers before the Sanitary Engineering Division, all by members of the United States Public Health Service, which are as follows: "A Review of the Work of the U. S. Public Health Service in Investigation of Stream Pollution," by W. H. Frost, surgeon; "The Rate of Deoxygenation of Polluted Waters," by E. J. Theriault, associate chemist. "The Rate of Atmospheric Re-aeration of Sewage Polluted Streams," by H. W. Streeter, sanitary engineer; "Quantitative Studies of Bacterial Pollution and Natural Purification in the Ohio and Illinois Rivers," by J. K. Hoskins, sanitary engineer.

NATIONAL CONFERENCE ON CITY PLANNING.

The program of the International Town, City and Regional Planning Conference, to be held in New York April 20 to 25, includes discussions of "The Traffic Problem and Typical City Plans," on April 20; "Planning Unbuilt Areas," on April 21; "Better Distribution of People and Industries," "How to Lay Out the Regions for Planning and the Government of Regions in Relation to Planning," "The Aeroplane and the City Plan" and "The New York Regional Plan," on April 22, and on April 23 "Zoning in Practice," "Zoning and the Street System," and the business session of the National Conference. Many experts from a number of European countries as well as from the United States will discuss these various topics.

NEWS OF THE SOCIETIES

June 2-5—AMERICAN ASSOCIATION OF ENGINEERS. Annual convention at Orlando, Fla.

June 17-20—SOCIETY FOR THE PROMOTION OF ENGINEERING EDUCATION. Annual meeting at Union College, Schenectady, N. Y.

June 22-26—AMERICAN SOCIETY FOR TESTING MATERIALS. Annual meeting at Atlantic City, N. J.

July 8-10—AMERICAN SOCIETY OF CIVIL ENGINEERS. Summer meeting at Salt Lake City.

Sept. 7-12—NEW ENGLAND WATER WORKS ASSOCIATION. Annual convention on board steamer on St. Lawrence River.

Oct. 26-29—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention at Des Moines, Iowa.

AMERICAN ROAD BUILDERS' ASSOCIATION

The annual spring meeting of the association was held in New York City on May 11. There were few addresses, the most important being that by the newly inaugurated president, William H. Connell. The officers and directors definitely selected Chicago as the location of the convention and exposition to be held next January. Charles M. Upham, business manager of the association, stated that a thorough study had been made of the facilities of New York, Boston, Atlantic City, Philadelphia, Washington, Pittsburgh, Cleveland, Cincinnati, Buffalo, Indianapolis, Louisville, Milwaukee, Minneapolis, Kansas City, St. Louis, Denver, San Francisco, and other cities, but none could provide facilities equal to those of Chicago. The great difficulty was to find adequate exposition and convention halls in a city with hotel accommodations for the 25,000 persons who attend. The exposition building must not only have vast floor space, but floors capable of supporting single exhibits weighing as much as 56 tons, and total exhibits of approximately 300 car loads of building machinery and equipment; while the roof of the building must be high enough to permit the operation of the tallest steam cranes and shovels.

ENGINEERS OF THE MID-SOUTH

A meeting of engineers of this section of the country, with a view to organizing an association, met on May 7 and 8 at Memphis, Tenn., at the invitation of the Memphis Engineering Club. About 150 engineers from eight states assembled. During the first day there were papers and discussions on city planning, sewerage, water supply. On the second day a visit was made to the city's new water works, the new Ford assembly plant, and to river improvement work in charge of the U. S. Engineer Corps. Shortly after this, one of two boats carrying the engineers on their return from this inspection overturned for some reason not yet explained, with the loss of many—probably twenty or more—of the engineers and their wives. This calamity brought the meeting to a mournful end without the organization that would undoubtedly have been effected otherwise.

STATE SANITARY ENGINEERS

This organization held its annual meeting at Louisville, Ky., April 25 and 27, just preceding that of the American Water Works Association. It is probable that the same idea will be adopted for 1926, the meeting being held at Buffalo, N. Y., where the A. W. W. A. has decided to meet.

The subjects receiving most attention, in the form of papers, reports and discussions, were the control by state health boards and officers of bathing places, oyster beds, sewage and waste disposal and stream pollution, water supplies, milk, mosquitoes and malaria. The committee on Surface Water Supplies submitted for adoption a code of principles as a part of a final report of unusual importance. This was ordered submitted to the A. W. W. A. at its convention a few days later, with a view to its adoption by that society also. Similar action was taken with reference to resolutions calling for the elimination of connections between public and private water supplies.

Among the papers read were: "Chlorination of Small Gravity Water Supplies," by W. A. Scott, of Connecticut; "What Should Policies of State Boards of Health Be in Control of Stream Pollution?" by C. A. Baker of Wisconsin; "Some Aspects of Rural Areas," by R. C. Deckett, of Delaware; "Control of Camp Sanitation," and "Cooperative Investigation of Industrial Waste Disposal," by W. H. Dittoe, of Ohio; "Evaluating Sanitary Engineering Progress in a State," and "Standardization of Reports of Bacteriological Analysis of Water," by G. W. Putnam; and "Highway Comfort Stations," by E. S. Tisdale, of West Virginia.

The following officers were elected for the year 1925-1926: Chairman, Richard Messer, engineer of the Virginia Board of Health; vice-chairman, F. C. Dugan, engineer of the Kentucky Board of Health; secretary-treasurer, A. P. Miller, sanitary engineer with the U. S. Public Health Service.

AMERICAN WATER WORKS ASSOCIATION

The 45th annual convention met in Louisville, Ky., April 27 to May 1. A general description of the doings of the convention will be found elsewhere in this issue. The papers read and discussions at the technical sessions are outlined in the following narrative.

Although the convention did not formally open until Tuesday, quite a large number of members were on hand on Monday and many of them attended the "Get-Together Meeting" of the superintendents with W. S. Cramer as chairman, while others attended meetings of the committees on "Standard Specifications for Water Meters" and "Standard Brass Fittings," and conferences to discuss material for the Manual. The meeting of the Plant Management and Operation Division adopted a constitution and by-laws and appointed a nominating committee consisting of Messrs. W. S. Patton, J. O. Craig and H. P. Bohmann. Several subjects were discussed at this meeting, including the size of automatic sprinkler connections, the cleaning of well strainers, and water works finances.

TUESDAY SESSIONS

In the morning, services were held in memory of the members who had died during the year, the convention standing while a prayer was delivered by Rev. Harris M. Krodt. The Mayor delivered a highly appreciated address of welcome which was followed by the reports of the secretary, treasurer and executive committee and the adoption of constitutional amendments, budget, etc., as described elsewhere in this issue.

The Committee on Standard Specifications for Water Meters reported progress, noting especially the agreement upon a standard dial; this report being presented by Mr. Brush in the absence of Chairman Saville. The Committee on Standard Brass Fittings reported progress. John M. Gooddell, secretary of the committee on Standard Form of Contract, in the absence of Chairman J. Waldo Smith, gave a report of progress, but one containing several details of actual progress, making special reference to the provision made for arbitration and to the recently adopted Federal Arbitration Law. Mr. Fuller, reporting for the Standardization Council, told the Convention the status of the Manual which the society hopes to publish this fall, the work that had been done and that which the Council hoped to do and the aid which it hoped to receive from the members during the week of the convention.

The first paper read was one by Leonard Metcalf entitled, "Financial Status of Water Works and Price Trends of Materials and Labor Affecting Them." This paper was similar in its nature to others presented by Mr. Metcalf at former conventions but bringing the information up to date. A paper entitled, "Justification of a Program to Beautify Water Works Properties," was read by Charles R. Denman in which he described, and illustrated by lantern slides, landscape improvements of the water works property at Des Moines, the principal features of which were the change of two borrow pits from unsightly holes to a lagoon and a pool enclosed by an ornamental balustrade, these and the entire grounds being planted with shrubbery and flowers. Several members expressed their approval of the expenditure for this purpose of what was really a very small part of the total

cost of the plant. The final paper of the session was one by William H. Lovejoy describing "Reconstruction of the Filter Plant at Louisville." Because of faulty design, including insufficient width of pipe gallery and undesirable height of the washwater troughs, part of the plant was changed to remedy these defects, the cost of the reconstruction being $60,000.

In the afternoon V. Bernard Siems read a paper entitled "Problem of Water Supply for Fire Protection," which was discussed by J. J. O'Brien, Fire Chief of Indianapolis, and Clarence Goldsmith, of the National Board of Fire Underwriters. Mr. Siems considered that, since the advent of the automobile fire pump, it is better to limit the pressure in the mains to 50 or 60 pounds for ordinary practice, with 75 pounds in a congested section with high buildings, and provide main capacity for abundant water, rather than secure the high pressure found in a number of cities. He considered it doubtful whether a separate high pressure system is economically desirable. In the discussion Mr. O'Brien urged cordial cooperation between Water and Fire departments. Dow R. Gwinn discussed the business side of Private Fire Protection.

L. A. Day, chairman of the committee on Pumping Station Betterments, presented a statement of "Recent Pumping Station Practice" which was offered as a part of the forthcoming manual, but which, as it would make about 66 pages, required to be boiled down. Mr. Chester raised the question concerning the limit of capacity above which steam would be recommended and below which gasoline or electricity. He suggested that 2,000,000 gallons per day be made the dividing line, but apparently agreed with others that no definite line could be fixed since it would be dependent upon local conditions and those of the plant itself.

WEDNESDAY SESSIONS

Wednesday morning was Fire Prevention Session in charge of N. S. Hill as chairman. The question as to whether water works should provide high pressure or the city should provide pumpers, or whether both were necessary, was discussed by L. K. Sherman. H. A. Dill considered that extra pressure for fire was expensive both for fuel and especially for repairs to private and public water works fixtures, and was seldom necessary. N. S. Hill called attention to the fact that it is pressure at the hydrant rather than at the pumping station which is the important point and this introduces the question of capacity of mains.

Mr. Bohmann brought up the subject of independent valves on hydrant connections stating that in Milwaukee they were putting them on all new hydrants but there are none in the high-value district which is the oldest part of the system. Mr. Gwinn stated that his company had used such valves for years. Mr. Normon said they were used on all hydrants in Kalamazoo. It was reported that Knoxville puts valves on hydrant branches whenever repairing hydrants, which is more or less frequent because of the destruction done by automobilists. Hydrant valves are required to be placed in all cases before permanent pavements are laid. Mr. Little believed that the expense of these valves was not warranted in residential districts, while Mr. Cramer considered them necessary along all mains of ten inches or larger. Mr. Taylor, New Bedford, thought it better to divide the system into smaller sections by thorough gating of the mains.

A. C. Hutson of the National Board of Fire Underwriters, presented "Modern Views as to Service Reservoirs and Desirable Pressures," in which he stated that 60 to 75 pounds pressure in the mains was thought most desirable. Discussing this, Mr. Brush said that in duplicating supply mains, attention should be paid to duplicating valves in all lines connecting the duplicate mains. In the matter of hydrant repairs, New York maintains special gangs for this purpose alone and they manage to keep up to within three days in this work.

At this point, Clarence M. Baker of the Wisconsin State Board of Health, brought up the subject of cross connections between public and private supplies, with a view to obtaining a definite statement by the Society opposing such connections. A committee was appointed to formulate such a resolution and it was adopted at a later meeting. In the discussion of the subject it was stated that Minnesota has passed a law making all such connections illegal and that Hartford, Conn., has eliminated them after having tried double check valves.

Beekman C. Little, in a paper entitled "How Jonesborough Built Its Water Works," described the procedure of an imaginary crossroads settlement in securing a water works system as it evolved into a community of more importance. The suggestions as to procedure by citizens of small communities were so excellent that it was suggested that the article might well be published in the Saturday Evening Post so as to reach the maximum number of non-technical readers.

James E. Gibson presented the report of the Committee on Standardization of Services, which brought out considerable discussion in the afternoon session.

The afternoon session began with a summing up by Mr. Chester of the discussion of pumping engines, at which several points of interest were brought out such as that the Pennsylvania Railroad believes 1,000 horse power is the minimum for which mechanical stokers are practicable. In reference to type of pump, Mr. Fenkle stated that he had known of many breaks in mains which were due to pump pulsation. Concerning deep well pumps little was said except that one member considered them a nuisance, in reply to which Mr. Christy told of a 1,500,000 gallon centrifugal pump which had been pulled only twice in the seven years it has been in service, while two others installed later had never been pulled. Concerning air lift, Mr. Day told of a duty of 70,000,000 per 1,000 lbs. of steam although 50,000,000 is more common.

The discussion on Mr. Gibson's report on service pipes was then taken up. One member stated that he used ¾" corporation cock with McWane 1¼" cast iron pipe and used 1" cock for double connections. Other members stated that they always used a corporation cock one size smaller than the service. Mr. Brush told of lead pipe services which had burst because softened by the heat from nearby steam mains. Several members expressed much objection to the suggestion to adopt a standard minimum size, believing that this should be regulated by the pressure, character of water, and other conditions peculiar to the city in question. A show of hands was asked on the subject and a decided preference was shown for ¾" as the minimum size. Members were also asked to express their opinions in the same way on other subjects, and practically all favored water works ownership of services up to the property line; while about sixty per cent opposed the installing of services preliminary to their use in order to avoid future taking up of proposed street paving.

The final status of the suit to enjoin the Melcroft Coal Company, et. al. from polluting the supply of the Mountain Water Supply Company was then explained by A. L. Fales, this being one of the most important decisions affecting water works companies that has ever been handed down, at least in Pennsylvania; the effect of the decision being, if supported by the highest courts, to require coal companies to cease discharging into streams acid and other polluted waters from coal mines or other properties. The mine owners claim that this is impossible unless they shut down their mines. The opinion was expressed that the result would probably be a compromise, since it is unthinkable that coal mining in Pennsylvania should cease.

"Taxation for Water Plants in different States on Physical Property, Franchises, Income and Securities," the subject of a paper by H. Carl Wolfe, was discussed by Messrs. Gear, Morse, Taylor and Palmer. William Gore of Toronto, discussed the subject of "Allocation of Sources of Water Supply and Means for Compensation for Diversion in Money and in Kind." In British procedure, compensation in kind is the rule, but Leonard Metcalf stated in the discussion that Hazen, in an investigation for Boston, had questioned whether payment in money would not be financially preferable.

THURSDAY SESSIONS

The first paper on Thursday morn-

ing, "Additional Water Supply Project for East Bay Municipal Utility District in California," by Arthur P. Davis, had been published in the Journal and was read by title, Malcolm Pirnie giving a general outline of the project to invite discussion. N. S. Hill then presented a report as member of the Joint Committee on Electrolysis, on which are members of several other societies as well as representatives of the U. S. Bureau of Standards, stating that there had been no conclusive information furnished at any of the meetings since the report of 1921. Some of the committee questioned the value of pipe drainage. More investigation of the subject, including the grounding of service pipes, was thought to be necessary and the Convention voted to continue the committee.

Arthur E. Gorman described "Chicago's Experience with Large Land Tunnels," the special features of which were the polluting of the water in several of the tunnels, apparently from an abandoned tunnel among other possible sources. He stated that Chicago's experience showed the value of making bacterial analyses of water taken at control points distributed between the source and the consumer's tap, daily samples over extended periods giving much more reliable data than any number of samples taken on a given day. Mr. Brush in discussing this paper, and later in a paper of his own entitled "Proposed Secondary Chlorination of New York Water Supply, after Leaving the Open Reservoir at Hillview," stated that although there are five chlorinating plants on the Croton watershed and a large one treating the outflow from the Ashokan reservoir of the Catskill supply, the water is chlorinated at several other points between this reservoir and the city distribution system; the Croton supply being treated at the gate house at 135th Street, and the Catskill supply at the outlet from Kensico reservoir and the outlet from Hillview reservoir, into which reservoirs it is possible additional pollution may have entered.

Thursday afternoon was devoted largely to Fire Protection discussion. The method of obtaining information concerning prevailing practices by asking for a show of hands by the members was continued. Mr. Brush asked how many cities maintained emergency crews, to which about twelve responded affirmatively. About the same number stated that they placed restriction on the size of fire service connections, some limited such connections to 4 inches, some to 6, some to 8 and a few to the size of the mains, while four placed no limit to the size. Twelve reported using meters on fire service connections while twenty reported that they did not use them; two of the latter, however, that they were in favor of them. In duscussing this last point one member stated that Kalamazoo won a $20,000 law suit against a local paper company which had been taking water for manufacturing purposes from the sprinkler pipes. In the matter of charging for private fire protection, about thirty stated that they made such charges and three that they did not.

Americans will not wait

Accustomed to instant communication by telephone and telegraph, our military authorities realized in the late war that the American Expeditionary Forces could not depend on the communication services of Europe.

The necessary plans, materials and engineers were sent over in ship loads. A world record was made by the Signal Corps in establishing lines of communication indispensable to every branch of the army. In a surprisingly short time, every American general in France had at his disposal the communication facilities to which, in America, he had been accustomed.

Europe was sometimes startled by the amazing methods of the telephone workers from overseas. The American-trained Signal Corps units invariably sought the shortest way, overcoming all natural obstacles to extend the needed means of communication.

The Americans were not content to wait. They expected and demanded the same ever-ready telephone connections which they had at home. The Bell System has set a world standard for prompt attention and continuous service.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES
BELL SYSTEM
One Policy, One System, Universal Service

FRIDAY SESSIONS

On Friday morning H. E. Moses presented the matter prepared for the manual on "Practice as to Watershed Protection," stating that this had been approved the previous Saturday by the Society of State Sanitary Engineers, which had held its annual meeting in Louisville. (This paper will be published in an early issue of Public Works.) It divided watersheds into four groups: 1, Relatively large inhabited watersheds. 2, Very small watersheds uninhabitated. 3, Watersheds with large storage reservoirs. 4, Intermediate type of water shed, exposed to pollution but moderately satisfactory with due care to protect it. In the discussion Mr. Foulks expressed the opinion that ownership was ideal for Group 4, but automobile users can not be educated to a realization of the need for sanitary precautions and he ad-

vised owning a 1,000 foot strip around every reservoir. He considered it a waste of country resources to withdraw large areas from use. Mr. Dittoe called attention to the necessity of keeping phenol wastes out of streams reaching the reservoirs. Referring to Pennsylvania's plan of establishing zones on the watersheds, Mr. Brush considered this of little or no value, also believing that public parking of watersheds was to be discouraged. Mr. Gore was emphatic in his belief that all surface water should be filtered. Mr. Gibson, referring to a suggestion that watersheds should be used as bird sanctuaries, considered this dangerous in that the birds might pollute the reservoirs.

T. H. Wiggin then presented for the Manual "Testing Water Works Materials and Supplies." Where the tests formulated by the American Society for Testing Materials applied, these were used. There were many materials, mostly chemicals, however, for which specifications and tests had been prepared, and these were read and discussed. Slight changes were made in the specifications for sulphate of alumina to provide that it shall be slightly basic. Under the head of lime there was a discussion of a bonus for excess lime. Mr. Gibson suggested adding specifications for caustic soda stating that he had used it in place of lime. Other chemicals included soda ash, chlorine, sulphate of iron and sulphate of copper.

Discussions by the division of Plant Management and Operation were then renewed, the first being an interesting description by President Jordon and an Indianapolis dealer in plumbing materials of the method tried in Indianapolis of selling plumbing on the instalment plan, which had proven quite successful.

In the afternoon, although it was the final session, about fifty members were present. Mr. Gwinn explained the advantages of calling in consulting water works engineers to outline the development of a water works property for fifteen years ahead, preparing a practical program therefor. Alexander Milne described an interesting experience in tunnelling at St. Catharines, Ontario. Members were asked to narrate their most interesting experiences during the previous year and President elect Huy told of a meter which ran alternately backward and forward without having been changed in any way, the direction of running depending upon the volume of flow, this being caused by wear in certain of the train gears. Another member told of very considerable under-registration discovered when meters too large for the service were used. Another member told of the advantages which he had derived from plotting curves from daily records of pumpage and consumption and comparing the two, any considerable change in relation between the curves probably indicating newly developed leakage.

The annual discussion on flushometer closets brought out the suggestion from two members of using a tank in the basement containing compressed air in the upper half to avoid the necessity of using large service pipes. Other subjects discussed were: "Who Should pay for services, either to the curb or to the cellar," and definite advice as to calculation of depreciation in water works accounting.

WATER PURIFICATION DIVISION

This division held sessions in a smaller room on Wednesday morning and afternoon, at which there was a symposium on the "Effect of Treated Water on Industrial Processes"; C. B. Morrison presenting a paper discussing "Chlorinated Water in the Baking Industry," A. E. Stevenson one on "Treated Waters in the Canning Industry," and R. W. Cunliffe "Chlorphenol Tastes in Milwaukee." There was general discussion of this and other subjects, reports of committees, etc., during these sessions.

EXHIBITS

The following firms occupied booths in the exhibit hall:

Mueller Co., Inc.; Water Works Equipment Company; The American City; R. D. Wood & Co.; Public Works; The Leadite Company; W. & L. E. Gurley; Thomson Meter Company; U. S. Cast Iron Pipe and Foundry Co.; Union Water Meter Company; Hersey Manufacturing Company; The A P. Smith Mfg. Co.; Buffalo Meter Co.; Builders Iron Foundry; Paradon Engineering Co.; Chicago Valve & Hydrant Co.; Bingham and Taylor—W. P. Taylor Successor; H. W. Clark Company; Rensselaer Valve Company; Engineering and Contracting; Fire and Water Engineering, Inc.; Wallace & Tiernan Co., Inc.; Eddy Valve Company; The Ludlow Valve Mfg. Co.; National Tube Company; Lead Lined Iron Pipe Co.; Neptune Meter Company; The Kennedy Value Mfg. Co.; Simplex Valve & Meter Co.; A. D. Cook, Inc.; Edson Manufacturing Corp.; Worthington Pump and Machinery Corporation; Birch Manufacturing Company; Lock Joint Pipe Co.; McWane Cast Iron Pipe Co.; Columbian Iron Works; National Meter Company; Canadian Engineer; National Water Main Cleaning Co.; American Cast Iron Pipe Company; Giant Manufacturing Company; Gamon Meter Company; Wailes Dove-Hermiston Corp.; The Pitometer Company; Pittsburgh Testing Laboratory; Sullivan Machinery Company; Hays Manufacturing Co.; De Laval Steam Turbine Co.; Edward E. Johnson, Inc.; Layne & Bowler Co.; The Central Foundry Co.; Electro Bleaching Gas Co.; Engineering News-Record; Multiplex Manufacturing Company; E. I. DuPont de Nemours & Co.; Roberts Filter Manufacturing Co.; East Jersey Pipe Co.; Van Gilder Water Meter Co.; F. B. Leopold Co. Inc.; Ford Meter Box Company; Badger Meter Mfg. Co.; Pittsburgh Des Moines Steel Co.; Pittsburgh Meter Co.; Federal Meter Co.; International Filter Co.; Lead-Hydro-Tite Company; B. Nicol & Co.; Cement Lined Pipe Co.; Glauber Brass Mfg. Co.; Vogt Bros.; National Cast Iron Pipe Co.; Philbrook Spring Pipe Clamp Co.

PERSONALS

Wiley, Major Wm. H., president of the firm of John Wiley & Sons, publishers of technical and scientific books for more than a hundred years, died on May 2, in his 83rd year. He had been connected with the firm for fifty years.

Pollock, James R., formerly sanitary engineer of Flint, Mich., has been appointed city engineer of Pontiac, Mich.

Wood, John W., for the past ten years engineer with the Metropolitan District Commission of Massachusetts, died at his home at Malden, Mass., on April 16.

Culpepper, H. S., maintenance engineer of the Georgia State Highway Department, has resigned, to become effective June 15.

ENGINEERS LOST IN THE MISSISSIPPI RIVER DISASTER

On May 8th, a boat carrying about seventy-five of those attending a convention of Engineers of the Mid-South, overturned in the Mississippi, causing the death of more engineers probably than any other accident that has occurred. Those believed to have been lost are named below:

Anderson, George L., aged 31; engineer in the employ of Ayres & Miller.

Bosard, Ralph (also his wife and son Edgar), aged 36; inspector for the Morgan Engineering Co. of Memphis.

Bowser, E. H., aged 69; superintendent of wood preservation, with the Illinois Central R.R .

Fox, S. Waters, aged about 70.

Gardner, Wm. M., aged 57; engineer with the Mississippi River Commission, in charge of the work being inspected by the engineers.

Hannum, Wm., aged 35; superintendent of construction for the Phoenix Utilities Co., of Memphis.

Kirkpatrick, Prof. W. G., aged 66; professor of municipal engineering in the University of Mississippi.

McNeilly, Prof. Robt. H., aged 45; professor of civil engineering in Vanderbilt University.

Miller, Chas. H., aged 60; president of the Miller-Butterworth Engineering Co., of Little Rock, Ark.

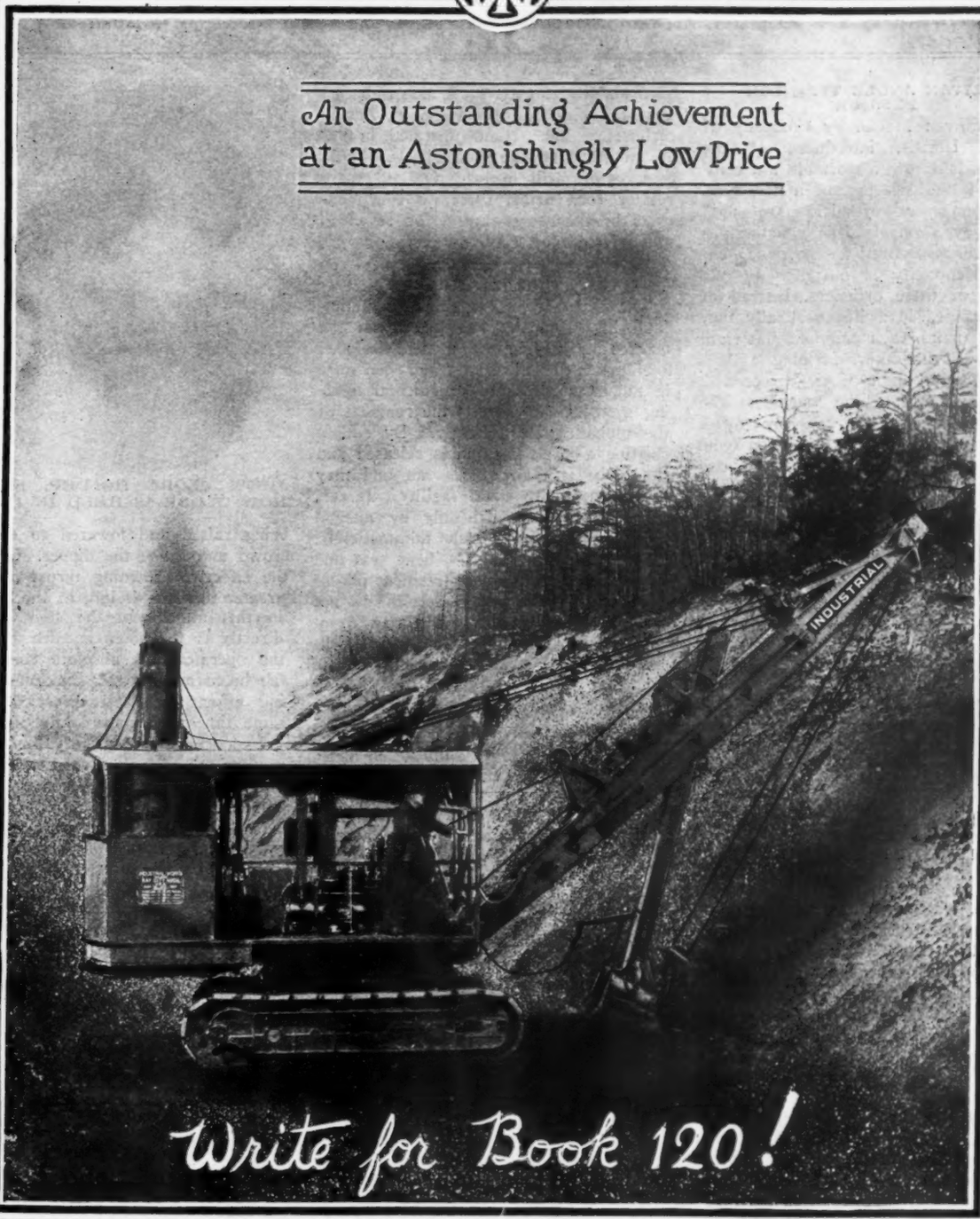
Norcross, Paul H., aged 45; consulting engineer, of Atlanta, Ga., specializing in water supplies and other public utilities; director of the American Society of Civil Engineers.

Shearer, Chas. E., aged 44; consulting structural and industrial engineer, of Memphis, Tenn.

Walker, Wm. O., aged 33; resident engineer for the H. W. Nelson Co., at Fulton, Ky.

Also the mother of L. L. Hidinger of Memphis, and the wives of Prof. Kirkpatrick and Prof. J. H. Dorroh.

An Outstanding Achievement
at an Astonishingly Low Price



Write for Book 120!

INDUSTRIAL
CRAWLING TRACTOR CRANES

INDUSTRIAL WORKS · · ·BAY CITY·MICHIGAN

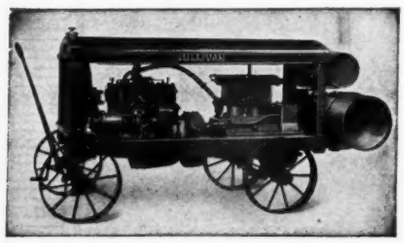
New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

SULLIVAN ANGLE TYPE COMPRESSOR

The Sullivan Machinery Company of Chicago, Illinois, introduced at the Good Roads Show a portable air compressor of new size and of a new type. The compressor cylinders are 5½" diameter by 5" stroke, single acting, as in the 110-foot Sullivan portable, but 220 feet capacity is obtained by using four of these cylinders. Instead of being arranged in a line vertically they are set in pairs, each pair being at right angles with the other, forming a "V," and being at an angle of 45 degrees with the vertical axis of the machine. The pairs of cylinders are slightly offset lengthwise, which permits operation from a single crank shaft. There are two crank pins, each accommodating two connecting rods.

The makers claim that the angle type described provides a counter-balancing effect which secures a marked reduction in vibration, the 220-ft. compressor

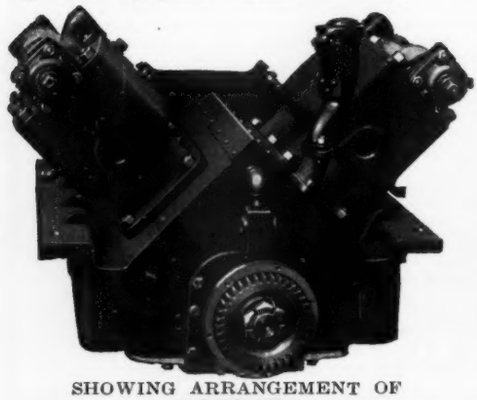


SULLIVAN AIR COMPRESSOR

running as smoothly and with as little vibration, whether bolted on a standard steel wheeled truck, on the trailer type rubber tire truck, or on skids, as if bolted to a permanent concrete base.

In details of construction the machine is similar to the WK-312, 110-ft. compressor. The reduction of vibration referred to permits reducing the weight to the low figure of 5,360 pounds complete, exclusive of oil, water and gas.

A 20x60 inch air receiver and a fuel tank of 25 gallons capacity are suspended in brackets at the compressor end of the rig. The equipment includes standard Sullivan fittings such as Racine radiator, Eiseman high tension magneto, Zenith carburetor, etc. Hand operated brakes are provided on the rear wheels. These compressors will operate two or three rotater rock drills, three or four concrete breakers or tampers, or seven to nine riveters or clay spaders.



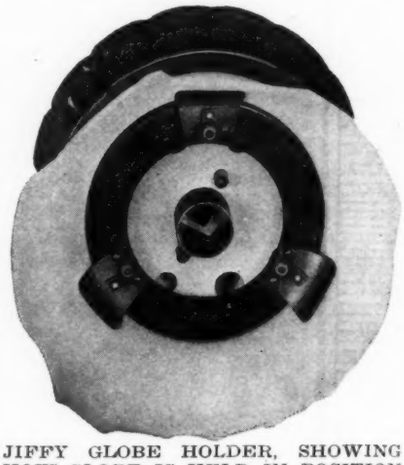
SHOWING ARRANGEMENT OF CYLINDERS

JIFFY GLOBE HOLDER

The Westinghouse Electric & Manufacturing Company has placed on the market a "Jiffy" globe holder, designed to eliminate globe breakage and economize in the maintenance of ornamental lighting systems. It permits the removal of the globe almost instantly. By simply shifting a lever, a catch is released and the globe is easily lifted out and may be replaced with equal facility. It can, however, be reopened only by manual means, as the device locks automatically. The globe rests on a resilient seat and is secured in position by resilient phosophor bronze grips, and screws do not come in contact with the glassware at any point. The holder absorbs shocks and prevents breakage occasionally caused by wind storms or jars. Provision is made for variation in tolerance in globes of different sizes and also for the expansion and contraction due to temperature changes.

BYERS BEAR CAT SHOVEL

Byers Machine Company of Ravenna, Ohio, has recently brought out an attachment for its Bear Cat, a gasoline powered full caterpillar unit, first introduced by the company about three years ago. Since then eight different attachments have been worked out. The latest of these is a half-yard shovel in which the crowding device is quite different from that usually found in gasoline shovels. The boom and dipper are both operated through live dums, the boom



JIFFY GLOBE HOLDER, SHOWING HOW GLOBE IS HELD IN POSITION

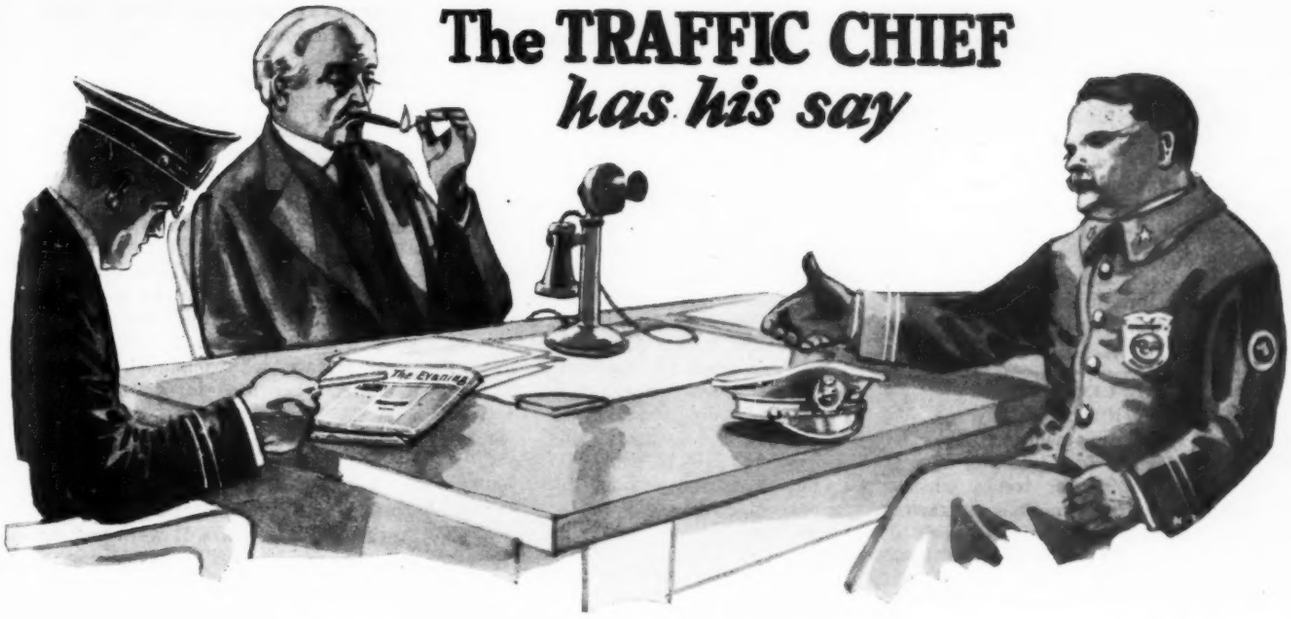
being raised and lowered to effect the crowd and shake the dipper. Ordinarily the effective crowding thrust can be no greater than the weight of the boom, but in this attachment the stick is hinged directly to the boom in such a way that the operator has absolute control over the boom and secures maximum crowding efforts in either direction. At the same time the shipper shaft mechanism, crowd drums, etc., usually found in such equipment are eliminated and thereby the wear at this point and the cost are reduced. The manufacturers claim that a daily yardage of between 300 and 400 yards may usually be expected at low cost of operation as well as low first cost.

GENERAL MOTORS TRUCK COMPANY.

This company announces two new truck models, one a 1-ton truck with 4-wheel brakes, said to be the first truck so installed, and the other a 1½-ton truck, the first of this capacity manufactured by the General Motors Com-

"BEAR CAT" HALF-YARD SHOVEL

The TRAFFIC CHIEF *has his say*



THE mayor is "determined"—the police superintendent "at his wits' end"—too many traffic accidents—newspapers "riding 'em" in scathing editorials—the fickle public clamoring for a reduction of auto accidents or the mayor and police heads' "scalps." Then they decide to "bring the matter to an issue"—they'll call in the chief of the traffic department and "get at the bottom of it."

He comes in and listens with a tolerant air and accepts all the blame—then throws this bomb—"Listen, Gentlemen — our principal down-town streets were designed and laid out in 1865. They are ordinary 30 to 50 ft. streets—but plenty wide enough for 1865. Since then the street cars have come in and some 50,000 automobiles owned and operated within the city are using these selfsame streets that were designed to accommodate the horse drawn traffic of 60 years ago.

"My department can't stop traffic accidents unless you stop the street cars, direct tourists around the city and close up automobile sales rooms—or give us electrically operated traffic control units."

ESSCO Stop and Go Units

ESSCO MFG. CO., Peoria, Ills.

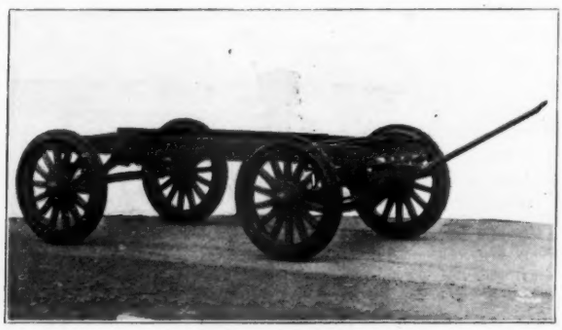
114 HARRISON ST.

"PIONEER BUILDERS OF GUARANTEED TRAFFIC EQUIPMENT"

pany. The 1½-ton truck also includes 4-wheel brakes and has 3-point engine suspension, cushioned to eliminate noise and vibration, and newly designed axles. It is designed to fill the demand for a faster mobile motor truck between the light and heavy-duty classes. In both of these trucks attention has been paid to the comfort of the truck operator in rearranging the steering wheel and brake and clutch pedals so as to be more convenient to him, and to the general outward appearance of the car, the radiator, hood and chassis lines being made more graceful.

THE RIX HAULER

The Squier-Rix Company of Milwaukee, Wisconsin, manufactures a Rix Hauler designed for use with tractors and high speed motor trucks which it recommends for use by contractors, lumber dealers, for municipal work and for mounting of portable equipment such as air compressors, pumps, concrete mixers, etc. for rapid transportation. It is made in both low wheel and high wheel models. The rated capacity is 5,000 pounds



THE RIX HAULER

and the weight of the chassis is 1,240 pounds. The frame is 8'6" long, but can be lengthened two feet by multiples of 6 inches. The width of the frame is 33", depth 5" and height from ground 30". The wheels may be of semi-steel cast disc with 22 x 4½" tires, or the best quality of wood with 34 x 4" S. A. E. solid tires. Timken bearings are used throughout. It is equipped with a special steering device of the automobile caster type, which insures easy steering and that the hauler will follow the path of the power unit

NEW SEWER PIPE JOINT.

The Presstite Engineering Company, of St. Louis, Mo., has placed on the market a new pipe joint for sewer pipes for which it claims the advantages of being self-centering, watertight, rootproof, acid-proof and flexible.

Presstite is an asphalt joint furnished in strips of the exact length to fit the given size of pipe. The strips are made of a core of pliable asphalt in a fabric casing through which the asphalt has been forced until it forms an adhesive surface coat. The strips are wedge shaped, tapering to the outer edge of the bell and wider at the seat of the bell. They are inserted in the bell by hand and the pipe is then placed in the trench and the joint pressed home by means of a special jointing device. This device clamps over the bell of the pipe previously laid and, by means of a simple lever pressed down by the hand or foot, presses the new pipe into position, exerting a pressure of 2,000 pounds or more upon the joint of the pipe.

CONTRACTION ROAD STRIP.

The Concrete Engineering Company, of Omaha, Nebr., manufactures a sheet steel contraction road strip to accommodate any width of slab, with holes punched for reinforcing bars at any spacing specified by the state or county. The strips are made of standard lengths of 10 feet 2 inches. Those for 5½ and 6½-inch widths are made of No. 18-gauge steel, and the 6-inch, 6½-inch, 7-inch and 7½-inch of No. 17 gauge.

The company also manufactures double tapered wedge pins to be used with these strips.

A NEW SEWAGE PUMP

The Yeomans Brothers Company of Chicago, Illinois, have recently brought out a vertical shaft sewage pump of new design. It is of the two-port semi-enclosed impeller type and is designed for handling unscreened raw sewage. As shown in the cut, the pump thrust bearing is mounted on a wide bearing yoke supported on the pump volute, which permits raising the top plate to give access to the interior of the casing without disturbing the bearing, shaft or impeller; the stuffing box being provided with a removable split gland so as to allow maximum clearance under the bearing. This yoke construction is said to be a unique feature of these pumps. The illustration shows a 10" pump of this design arranged for mounting on concrete piers and for bottom suction connection. It is claimed that this 10" pump will pass 7" diameter spheres.

The curve in the accompanying diagram represents an actual test of this machine.

These pumps are equipped with bronze mounted steel shafts and the entire weight of impeller, shaft and shaft extension is carried on a self-aligning ball thrust bearing mounted on motor base plate at the upper floor level, the pump thrust bearing serving only as a guide bearing and for centering the impeller.

The manufacturers have recently built one 10" and two 12" pumps of this design for the city of Santa Barbara, California.

NATIONAL HAMMER-WELD PIPE

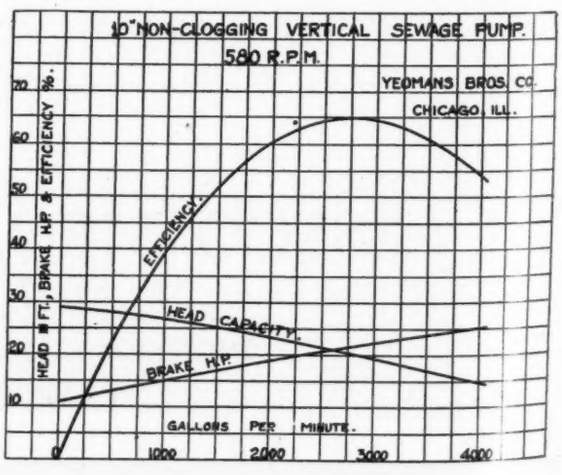
The National Tube Company, of Pittsburgh, Pa., is prepared to furnish hammer-weld steel pipe in sizes from 20 to 96 inches, with various wall thicknesses. Its larger fields of service are for water, gas, steam and various types of pumping or power plant installations.

The pipe is made by bending a steel plate into tubular form with edges overlapping and welding the overlapped edges, after they have been heated, by hammer-forging them on an anvil block supported on a horn inside the pipe. This gives a perfectly smooth, unbroken interior surface, with a minimum of friction loss, when used for water or other liquids.

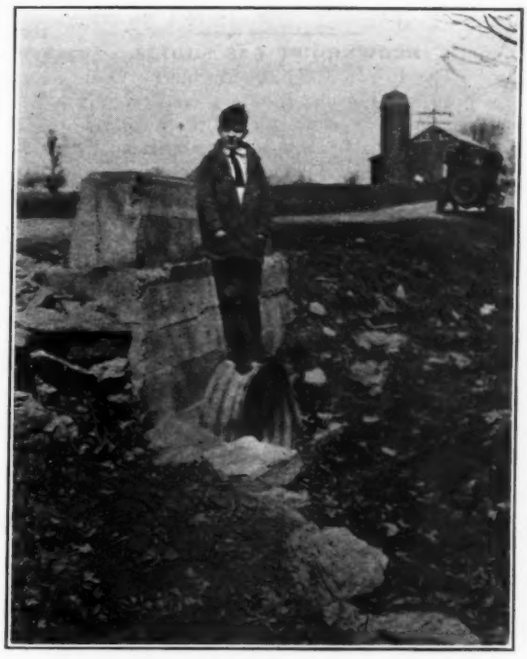
SILENT CHAIN DRIVES

The Link Belt Co., of Indianapolis, Chicago and Philadelphia, announced in April that, after years of work and study on the problem of standardizing and manufacturing silent chain drives for stock, it can now furnish immediately, through distributors located in many of

YEOMANS SEWAGE PUMP



RESULT OF TEST OF YEOMANS PUMP



A Genuine Open Hearth Iron Culvert

On Kentucky State Highway

After all has been said on the importance of proper subgrades, and all other factors of construction bearing upon the wearing qualities of this, that or the other Road Surfacing material have been discussed, the evidence shows that Drainage is the most vital consideration. This applies to all types of Road Surfacing.

Perfect Drainage is secured by the installation of "Genuine Open Hearth Iron" Culverts for all conditions. Their Span of Life is far greater than that of any other road building material yet discovered.

We are the exclusive manufacturers of Culverts made of this remarkable iron and solicit your inquiries.

Newport Culvert Co., Inc.

NEWPORT, KENTUCKY

the principal cities, silent chain drives of from one-quarter to ten horsepower, in practically any reduction from 1:1 to 7:1.

EXPANSION WHEEL FOR INDUSTRIAL FORDSONS

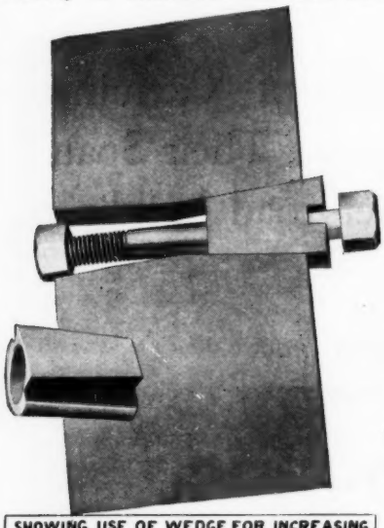
French & Hecht, of Davenport, Iowa and Springfield, Ohio, manufactures a built-up steel expansion-type wheel designed to accommodate hard rubber tires, which was developed for attachment to Fordson industrial tractors. These wheels are equipped with expanding wedge devices, which eliminates the necessity for heavy presses for applying or removing the rubber tire. Instead, the wheel is placed inside of the hard rubber tire, the expanding wedge devices are set in place and then drawn to the center of the rim by means of an ordinary

REAR WHEEL FOR INDUSTRIAL FORDSON
MANUFACTURED BY
FRENCH & HECHT
DAVENPORT, IOWA AND SPRINGFIELD, OHIO

wrench, this creating an expanding action which firmly seats the wheel into the rubber tire.

The steel spokes are forged into the hub while hot and have heads formed on the inside of the hub and shoulders on the outside, thus producing a fastening similar to that of a boiler rivet. They are firmly riveted into the rim in a trussed position, producing a light but strong and sturdy wheel.

The construction lends itself to the use of a wide rim which will accommodate 8″ or 10″ rubber tires without the necessity of attachment extension rims.



SHOWING USE OF WEDGE FOR INCREASING CIRCUMFERENCE OF WHEEL RIM

While these wheels are new for the Fordson, they have been used on motor trucks and other road equipment.

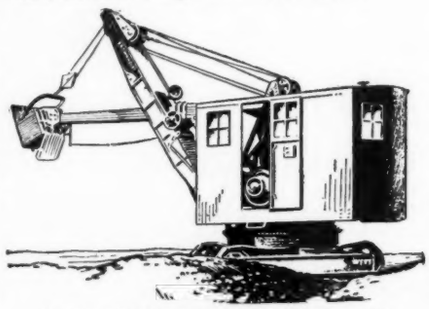
BROWNHOIST GAS SHOVEL

The Brown Hoisting Machinery Company of Cleveland, Ohio, has recently announced a new creeper truck shovel-crane of half-yard capacity, operated by a gas engine. The company claims of especial interest the extreme simplicity and accessibility of the machine (there being only 18 gears on the entire machine), its pivot steering device, and its fast operating speeds and ready convertibility to dipper shovel or clamshell work.

The pivot steering is an entirely new device and makes it possible to work in narrow quarters. Power is applied equally to both creeper belts for steering, but running the creepers in opposite directions, thus turning the machine around a point as a pivot. Steering is controlled entirely from the operator's position. Only three gears are needed below deck for both steering and traveling.

Although the machine has exceptionally fast operating speeds as either a shovel or a crane, all moving parts are slow running except the engine take-off gears, which are enclosed in a housing and run in oil, thus reducing the wear to a minimum.

The direct and independent dipper crowd, which is of the rope type and controlled by one lever, is employed on the shovel and gives the operator a wide and flexible range on shovel work.



BROWNHOIST HALF-YARD GAS SHOVEL

The interconvertibility of the half-yard shovel and crane is believed to be of special value to road contractors who have use for cranes and shovels at different times, but who do not wish to tie up considerable money on two pieces of equipment.

RUBBER TRAFFIC SIGNAL.

Fred J. Schrank, of Akron, O., is introducing a novel idea in traffic signals. It consists of a slab of tough, flexible white rubber 15 in. by 10½ in., a quarter inch thick at the top and five-eighths at the bottom. In the top half of the slab are imbedded black rubber letters spelling "stop," "slow" or other desired word. The signal stands upright in the roadway, being set in a cavity cut in the pavement 4 in. deep (asphant or concrete being used to cement it in place) and projecting 6½ in. above the surface. If the wheels of a car pass over the signal it folds down and immediately springs back to upright position.

Advantages claimed are that the motorist cannot fail to see it, and it is not concealed by snow, as is one painted on the roadway.

BUHL AIR COMPRESSOR

The Buhl Company, of Chicago, Ill., has just put out a new air compressor unit consisting of a vertical hopper cooled twin cylinder compressor, tank and all fittings mounted on a U-shaped cast steel frame which connects with the axle

BUHL AIR COMPRESSOR

housing of the Fordson, giving rigidity but allowing for a vertical motion. The trailer wheels are knuckled and connection is made to the steering mechanism of the tractor, permitting both tractor and compressor to be turned as a unit body and thus permitting permanent belted connection to be maintained.

INDUSTRIAL NOTES

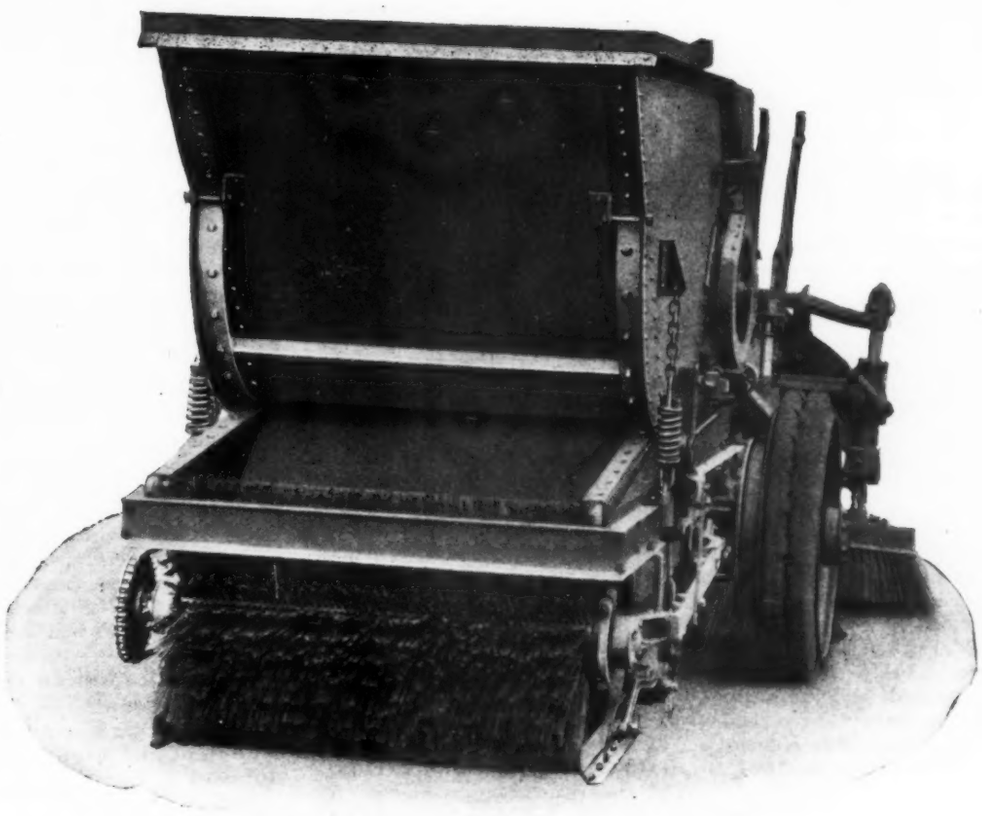
LAYNE GRAVEL WALL WELL

The Layne & Bowler Company, of Memphis, Tenn., has issued a new folder describing and illustrating the Layne patent gravel wall well, thousands of which have been constructed. The Layne Texas Co. recently completed for the city of Lufkin a well 112 feet deep that produces 1,200,000 gallons a day—several times the guarantee. This is said to be the largest well in Eastern Texas. In locating it the contractors drilled 15 test holes.

CATERPILLAR TRACTOR COMPANY ORGANIZED

All of the assets and rights of The Holt Manufacturing Company of Peoria, Illinois and Stockton, California, and of the C. L. Best Tractor Company of San Leandro, California, are being purchased by the Caterpillar Tractor Company, a new corporation organized under the laws of California, with an authorized capital stock of $12,500,000, the principal business of which will be that of manufacturing and selling the combined product of the concerns included in this merger.

The Board of Directors of the Caterpillar Tractor Company will consist of C. L. Best, R. C. Force, B. C. Heacock, O. L. Starr, of San Leandro, California, P. E. Holt of Stockton, California, Allen L. Chickering, Harry H. Fair, John A. McGregor of San Francisco, California, and Murray M. Baker of Peoria, Illinois. The official staff will be as follows: C. L. Best, Chairman of the Board; R. C. Force, President; Murray M. Baker, Vice President; P. E. Holt, Vice President; B. C. Heacock, Vice President & Secretary; and O. L. Starr, General Factory Manager.



for the most satisfactory and economical upkeep of city streets

TRADE MARK
Kinney
REG. U.S. PAT. OFF.

SPRINGFIELD MOTOR SWEEPER

No other device will clean pavements at so low a cost per square yard.

It not only removes the litter from the gutters and street surfaces but at the same time actually loads it into the carrying body of the sweeper and discharges it at any point desired. May be used to good advantage as a snow plow. Equipped with a Sprinkler System and a water tank of 150 gallons capacity.

Equipped with complete lighting outfit and Bosch generator for night sweeping. A machine of the highest mechanical construction, durability and efficiency. The five brooms have independent adjustments to conform to curvatives in the road.

SWEEPS IN A THOROUGH MANNER

Write for new catalogue showing complete detail of equipment

KINNEY MANUFACTURING CO.
BOSTON, MASS.

New York Philadelphia Chicago Houston Kansas City
San Francisco Philippine Islands Porto Rico Cuba Hawaiian Islands

The combined sales of the two constituent companies for the year 1924 were approximately $17,500,000. Trade indications at the beginning of this year point to a largely increased volume of tractor sales for 1925, and the sales to date amply confirm these indications.

The new company will own the following plants:

(a) The Holt Manufacturing Company, Peoria, Illinois, a plant occupying 40 acres of land, of which 14 acres are under roof. A plant fully equipped for the manufacture of 5,000 "Caterpillar" tractors per year.

(b) The C. L. Best Tractor Company, San Leandro, California, a plant occupying 10 acres, of which 5½ acres are under roof. Fully equipped for the manufacture of 2,500 "Track-Layer" tractors per year.

(c) The Holt Manufacturing Company, Stockton, California, a plant occupying 21 acres, of which 12 acres are under roof. Equipped for the manufacture of combined harvesting machines and for the manufacture of miscellaneous parts and sub-assemblies.

All of these properties will be owned by the Caterpillar Tractor Company in fee, and constitute, probably, the largest, most efficiently equipped and operated combined facilities in the world for the exclusive production of tractors of sizes applicable to industrial and agricultural purposes.

J. T. TRACTOR ORGANIZATION

The Hubbard-Floyd Co., Inc., 452 Lexington Avenue, New York City, is now representing the J. T. Tractor Company in the sale of five-ton full-crawler type tractor in the New York City territory. The company has also appointed the Ward Equipment Company of 331 Fourth Avenue, Pittsburgh representatives in eastern Pennsylvania and part of West Virginia, the T. J. Lane Equipment Company, Springfield, Ohio in central Ohio; and Curtis & Burgess of 1412 Syndicate Trust Bldg., St. Louis, Missouri, in Missouri.

INDUSTRIAL WORKS ORGANIZATION

The Industrial Works, Bay City, Mich., announces the opening of district offices at 425 Whitney Central Building, New Orleans, in charge of John A. Abele, district sales manager; and one at 843-A Hurt Bldg., Atlanta, Ga., in charge of John J. Murphy, district sales manager.

It has appointed four additional district sales engineers—Dougles J. Calder, Conway J. Neacy and Monroe J. Frankel will have offices at the Chicago district office, 1051 McCormick Building, Chicago, Illinois; and Chester F. Delbridge will be located at the St. Louis district office, Railway Exchange Building, St. Louis, Missouri.

SULLIVAN DIAMOND DRILLS

The Sullivan Machinery Co., of Chicago, has recently published several new bulletins on diamond drills and hammer drills, one entitled "Sullivan C and CN Mounted Diamond Core Drills, Gas Engine Drive;" another—No. 81-G—describing a new rotating water stoper: 81F, a new edition of the catalogue on rotator hammer drills; and 81E, a new edition of that on water jet mounted hammer drills.

HOLLOWSPUN CONCRETE LIGHTING STANDARDS

The Westinghouse Electric & Manufacturing Co. last year purchased the concrete post business and Milwaukee plant of the Massey Concrete Products Corporation and will manufacture the Hollowspun line of monumental concrete standards heretofore turned out by that company.

TECHNICAL DICTIONARY LIBRARY

Brentano's, of New York City, has issued a series of technical dictionaries in six languages, in which all kinds of technical products are described (with illustrations) in English, German, French, Russian, Italian and Spanish. Fourteen volumes have been published, each dealing with a special subject, such as elements of machinery; electrical engineering; hydraulic, pneumatic and refrigerating machines; construction work. Wherever possible, the interpretation of each word or expression is given by either a drawing or a formula.

HARNISCHFEGER CORPORATION

The Harnischfeger Corporation (formerly Pawling & Harnischfeger Co.) announces the removal of its Pittsburgh sales office from 57 Fidelity Building to 612 Farmers Bank Building, Fifth avenue and Wood street. A. J. Dreyer is district manager and M. B. Bradley is sales engineer at this office.

The company has recently issued a 64-page book entitled "Forty Years of Progress." In this book is a history of the growth and development of this organization since its founding forty years ago, along with photographs and descriptions of the entire plant and personnel as it is today. Pictures and short descriptions of each of the various products in the electric crane, hoist, machine tool and gasoline excavator lines are also given. In all, this book gives a complete but concise description of the large P & H organization. Copies of this book will be sent on request

CROWN ROCK ASPHALT COMPANY

This company, of Cincinnati, O., announces the appointment as sales manager of Joe S. Boggs, formerly State Highway Engineer of Kentucky.

C. O. BARTLETT & SNOW CO.

C. W. Ross, formerly with the Beaumont Co., is now manager of the Philadelphia office of The C. O. Bartlett & Snow Co., designers and builders of materials handling and processing equipment, Cleveland. The Philadelphia office is located at 807 Schaff Building.

GRINNELL SOCKET FITTINGS AND CLAMPS

The Grinnell Co. of Providence, R. I., has issued a booklet describing Grinnell socket fittings of entirely new design which reduces size and weight, and socket clamp designed to comply with the requirements of the National Board of Fire Underwriters. There are 32 pages, with illustrations, tables of dimensions and weights, etc.

T. S. SMITH COMPANY NEW OFFICE

The T. L. Smith Company, of Milwaukee, Wis., has moved its New York office from the former address at 50 Church Street to 441 Lexington Avenue. A complete stock of this company's line of tilting and non-tilting concrete mixers is maintained by this office, being warehoused at Sedgewick Ave. and 167th St. A service station is also maintained, where all repair parts are fully stocked. M. B. Rider is the New York sales manager.

The company has recently distributed its 1925 Paver and Mixer Catalogue, of 64 pages, handsomely illustrated in two colors, which especially describes four new tilting mixers; also work on which Smith mixers have been used, including the Wilson Dam at Muscle Shoals, and the General Motors building in Detroit.

BARBER-GREENE COMPANY

The Barber-Greene Company of Aurora, Ill., has placed three assistants with its district managers, H. H. Driver to assist J. A. Gurney in Pittsburgh; Frank S. Howard, Jr., to assist E. D. Cassel in Cleveland, and P. S. Frederick to assist C. B. Gould in Detroit.

BARKER & WHEELER

Barker & Wheeler, engineers specializing in public utility valuations, and the designing and constructing of power systems, water supplies, and sewerage, have removed their New York office to 90 West street.

PORTLAND CEMENT ASSOCIATION

F. M. Whitfield has been appointed district engineer in charge of the work of this association in Tennessee, with offices in the Baird-Ward building, 150 Fourth Avenue North, Nashville. The office was formerly at Memphis. Mr. Whitfield has been with the Portland Cement Association since Dec. 1, 1923.

BROWNHOIST ORGANIZATION

The Brown Hoisting Machinery Company, of Cleveland, O., announces the following appointments in its sales organization:

J. P. Case, sales manager; J. F. Poland, manager of Chicago office; E. W. Taylor, manager of Pittsburgh office. In addition to his duties as sales manager, J. P. Case will be in charge of Cleveland Division Sales.

BRODERICK & BASCOM ROPE CO.'S NEW PLANT

Broderick & Bascom Rope Co., of St. Louis, Mo., has recently moved into a new million dollar fireproof plant occupying an entire city block in the industrial section of Northwest St. Louis. The wire warehouse has a storing capacity of 8,000,000 pounds of wire.

NEWS OF THE SOCIETIES

June 17-20—SOCIETY FOR THE PROMOTION OF ENGINEERING EDUCATION. Annual meeting at Union College, Schenectady, N. Y.

June 22-26—AMERICAN SOCIETY FOR TESTING MATERIALS. Annual meeting at Atlantic City, N. J.

July 8-10—AMERICAN SOCIETY OF CIVIL ENGINEERS. Summer meeting at Salt Lake City.

Aug. 17-20—INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS Annual convention at Hotel Statler, Detroit, Mich.

Sept. 7-12—NEW ENGLAND WATER WORKS ASSOCIATION. Annual convention on board steamer on St. Lawrence River.

Oct. 12-13—SOUTHWEST WATER WORKS ASSOCIATION. Convention at Tulsa, Okla.

Oct. 26-29—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention at Des Moines, Iowa.

NEW ENGLAND WATERWORKS ASSOCIATION

A joint excursion of the New England Waterworks Association and the Boston Society of Civil Engineers will be made on Thursday, June 25th, when they will visit the new $20,000,000 water supply for the city of Providence. This will include the Scituate dam, now nearing completion, the 94" to 60" steel water main and 50,000,000 gallon filter plant. Inspection will also be made of the aqueduct tunnel.

BOSTON AFFILIATION COUNCIL

The Council of the Affiliated Technical Societies of Boston held its annual meeting at the Engineers Club on June 1st. The Massachusetts Highway Association was admitted to membership. A report was received from the Advisory Committee on Public Improvements for the city of Boston. The following were elected officers to the Council for the ensuing year: Chairman, Frederick M. Gibson; Vice Chairman, Frederic A. Eustis; Vice Chairman, Thomas S. Knight; Treasurer, Alfred Kelogg; Clerk, Peter D. G. Hamilton.

The Treasurer reported receipts for the year ending May 21st of $10,798 and disbursements of $10,784. The Secretary reported the membership, after eliminating duplications, as 3207, divided among ten affiliated societies; the largest membership being that of the Boston Society of Civil Engineers—975, and the smallest that of the Plant Engineers Club—28. Affiliation meetings had been held on November 19th, April 29th and May 14th. The Employment Clearing Bureau reported that sixty-five positions had been open during the year and the qualifications of about one hundred eighty men available had been kept on file. The net cost of the Bulletin for the year had been $600.

The Affiliated Technical Societies of Boston has been in existence three years and has made definite progress toward carrying out its purpose of "bringing the technical societies of Boston and their members into closer touch with one another for more effective service and for the advance of scientific investigation, education and research."

NORTHEASTERN SECTION A. S. C. E.

The regular Spring meeting of this section was held May 16th with 22 members present. The President announced the appointment of a special committee to report on a code of ethics and rules of practice. The speaker of the afternoon was Commander Robert B. Hilliard, Construction Corps, U. S. Navy.

BOSTON SOCIETY OF CIVIL ENGINEERS

On June 6th members of the Sanitary Section of the Boston Society of Civil Engineers visited the Lawrence Experiment Station, which has been in operation since 1886.

ENGINEERING INSTITUTE OF CANADA

This society will hold a Western Professional meeting at Banff on July 13th to 16th. This will be the second convention of this kind to be held at this location. Members and their wives and families will live under canvas, accommodations for about two hundred persons being arranged for. The camp will include dining facilities as well as cots, bedding and general conveniences.

NEW YORK SECTION A. S. C. E.

This section, at its annual meeting on May 20th, elected for the ensuing year: President George P. Ray; Vice President, John P. Hogan; Treasurer, Chas. A. Mead. Harold M. Lewis is Secretary of this section.

PERSONALS

Biehl, Richard, city manager of Westerville, Ohio, has resigned to become city manager of Two Rivers, Wisconsin.

Whitney, L. G., for several years employed by the Government Research Bureau at Detroit, Michigan, has become city manager of Westerville, Ohio.

Gross, C. P., has been appointed city engineer of Wisconsin Rapids, Wisconsin.

Jerome, George, resigned as city engineer of Detroit, Michigan, to take effect June 1st.

Fellows, Perry A., for eight years past associated with Frederick Stearns and Company, Detroit, has been appointed city engineer of Detroit, Michigan.

Manlev, J. C., who resigned as city engineer of Tacoma, Washington, a year or two ago on account of ill health, has been reappointed to that position.

Olson, W. M., formerly junior sanitary engineer with the Chicago Department of Health, has been appointed sanitary engineer of the Cook County Department of Health.

Connell, W. J., has been appointed city engineer of Menomonee Falls, Wisconsin.

Morse, Starling M., formerly county engineer of Apache county, Arizona has been appointed city manager of Mesa, Arizona.

U. S. CIVIL SERVICE EXAMINATIONS

Technical Assistant in Sanitary Engineering.—Applications received until June 27th. To fill vacancy in U. S. Public Health Service at Cincinnati, Ohio. Entrance salaries range from $1,500 to $2,200. To carry on public health engineering work pertaining to stream pollution, sanitary surveys, treatment of water, sewage and industrial wastes, drainage and anti-malarial measures, sanitation of milk and shell fish, and elementary chemical and bacteriological laboratory work.

Junior Cartographical Engineer—Applications received until June 27th to fill vacancy in Coast and Geodetic Survey, at Washington, D. C. Entrance salary $1,860 per year with possible advance to $2,400. Applicants must have completed at least three years of a civil engineering course, graduation from which is required before appointment. To utilize data resulting from field surveys of the Bureau or obtained from a wide variety of miscellaneous sources in the compilation and correction of the nautical charts and other professional work in related physiographic problems.

Principal Architectural and Structural Steel Draftsman.—Applications received until July 11th. To fill vacancies in Lighthouse Service, Department of Commerce, throughout the United States. Entrance salary $2,100 with possible advancement to $2,700. To perform, under general supervision, difficult freehand or architectural and structural steel drafting, requiring judgment, skill, a thorough knowledge of the customs and practices of the drafting occupation in expressing ideas, plans and data in drawings, or to supervise draftsmen of lower grades.

Land Appraiser, Associate Land Appraiser, Assistant Land Appraiser and Senior Land Appraisal Aid.—Applications will be received until August 31st. To fill vacancies in the Interstate Commission for valuation of the property of common carriers. Entrance salaries $3,800, $3,000, $2,400 and $1,860 respectively for the four positions; with possible advances to $5,000, $3,600, $3,000 and $2,400 respectively. Most of them will be for work in the field and appointees will be subject to assignment wherever the exigencies of the service will require, an allowance of $4 a day for subsistence in addition to traveling expenses being granted when absent from headquarters.

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

IMPROVED MIAMI SCRAPER

The Miami Trailer-Scraper Company, of Troy, Ohio, announces, for this season, improvements to its Fordson One-Man Power Scraper. The bronze gear in the winch has been increased to 1⅞ inches in diameter and the frame increased from 5 inch channel to 6-inch, making a very rigid unit.

One of the most important improvements is the cast steel automatic hitch. The ordinary plow hitch is entirely removed from the tractor and a heavy hook is bolted in its place, using the same stud bolts and thus necessitating no holes being drilled. The scraper can be entirely disconnected from the Fordson in thirty seconds, leaving the tractor available for other work. The cast steel hitch is also sold separately, many contractors finding it valuable for various other pieces of equipment.

The company has compiled some interesting dirt moving costs taken from actual operations which will be mailed free to any one upon request.

THE MARLOW "MUD HOG"

A. S. Marlow, of Lincoln Park, N. J., manufactures a diaphragm force pump for use in pumping sewage or sludge, by the general contractor, or other work in handling thick or muddy liquids. For caisson pumping it will handle a suction lift of 10 or 15 feet and discharge through pipe or hose at an elevation above the pump, giving a total lift of 30 to 40 feet.

The pump uses the standard Edson pattern of diaphragm, but one developed especially for this pump which will give several times the service given by the usual commercial grade. A diaphragm can be replaced easily by one man in 20 minutes, and the heaviest piece to be handled in doing so weighs only 27 pounds. The walking beam is made of steel bars with renewable bushings on each bearing. Each bearing is lubricated with a grease cup, which keeps sand and grit out of the bearings. Ball valves are used, which seldom clog, and the construction permits immediate inspection and cleaning in case of clogging.

Either Fairbanks-Morse or Fuller & Johnson engines will be furnished, at the customer's option; or electrically driven outfits can be furnished. The whole is mounted on a truck with steel wheels with wide tires. The standard gear is such as to run the pump at 58 strokes per minute; but if it is to pump thick liquid, like very thick sewage sludge, special gear is furnished giving 40 strokes a minute.

Two sizes of pump are made, with capacities of 3,000 to 4,000 gallons per hour and 6,000 to 8,000 respectively; and each size can be used for a double pump, giving double these capacities. The smaller pump has 13″ diaphragm and 3″ hose connection; the larger 14¾″ diaphragm and 4″ hose connection.

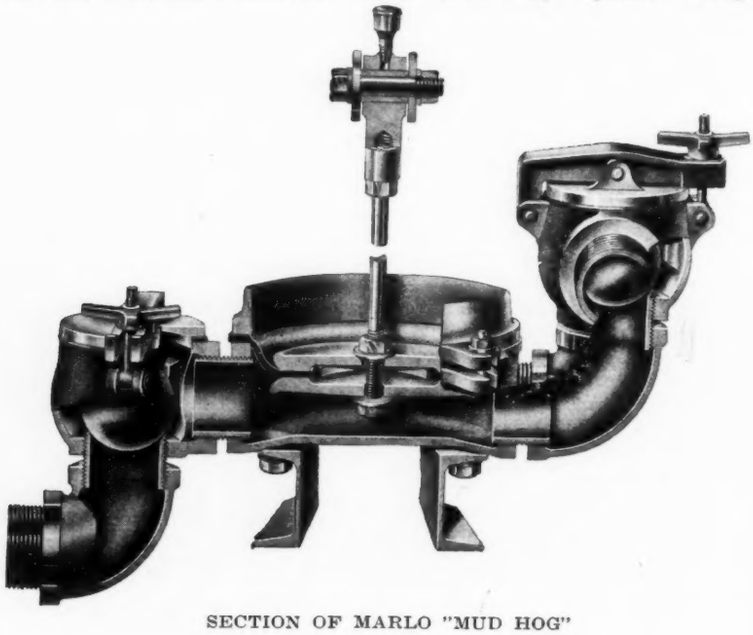
WESTINGHOUSE ORNAMENTAL STREETHOODS

The Westinghouse Electric & Manufacturing Company of East Pittsburgh, Pa., has recently brought out two new multilux streethoods designed for use with holophane 2-way and 4-way refractors as well as bi-lux refractors or luxolite globes. These streethoods consist of an ornamental cast-iron body made up of two parts, a cap and a skirt; all joints carefully sealed, making the complete unit thoroughly dust, bug and rainproof.

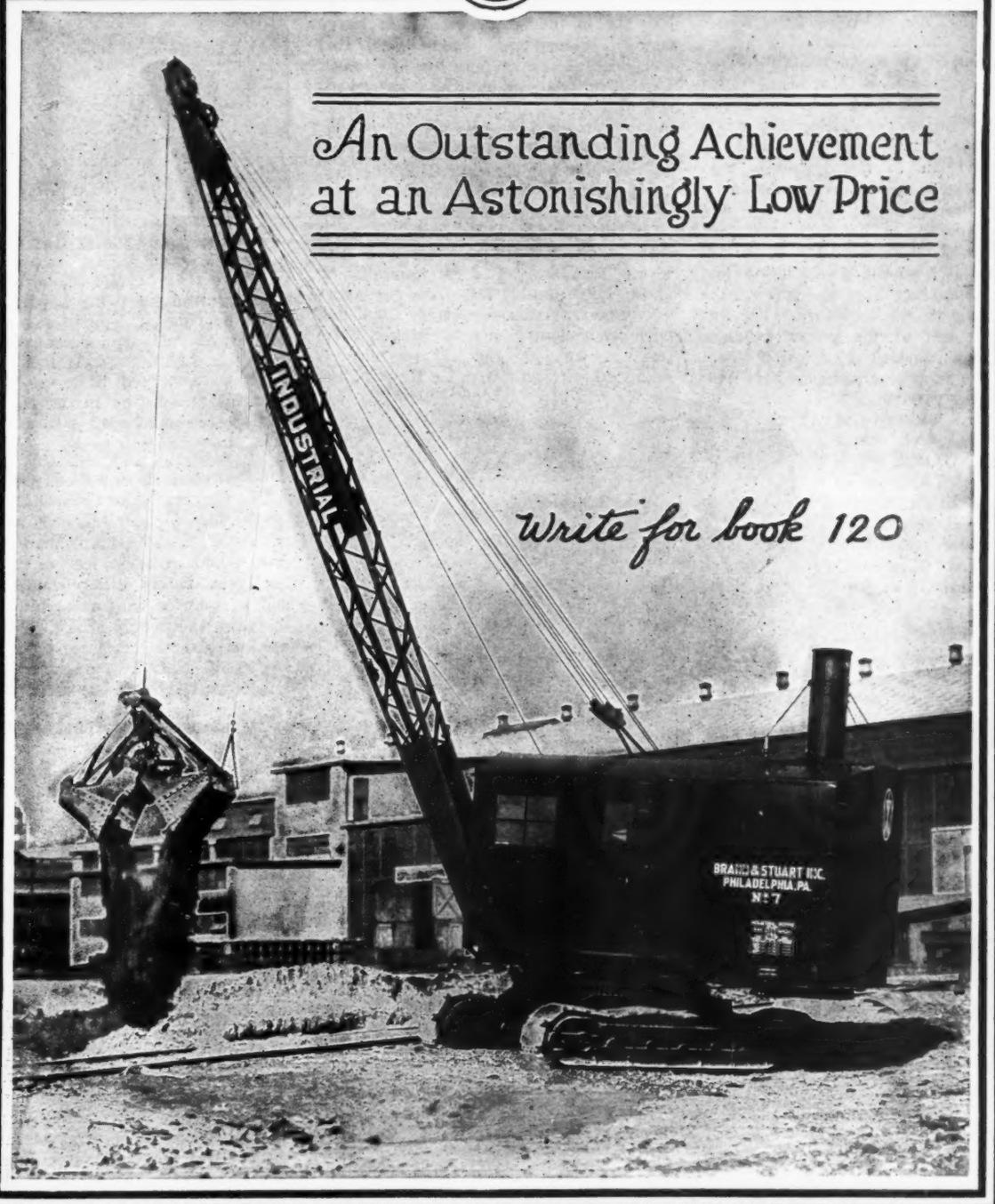
MULTILUX STREETHOOD, WITH REFRACTOR FOR DISTRIBUTING LIGHT UP AND DOWN THE AVENUE

This type of streethood is particularly recommended for small communities where ornamental units mounted on standards are unsuitable. When used with ornamental crooks they make an inexpensive and effective lighting unit for such use. The multilux series streethood is suitable for operation on standard series circuits with 2,500 to 6,000 lumen series lamps; while the multilux universal streethood is suitable for multiple service with 300 to 500-watt lamps, for low voltage series service with 15 or 20 amperes, 4,000 to 10,000 lumen series lamps operated through

NEW HITCH FOR MIAMI SCRAPER



SECTION OF MARLO "MUD HOG"



An Outstanding Achievement at an Astonishingly Low Price

Write for book 120

INDUSTRIAL

CRAWLING TRACTOR CRANES

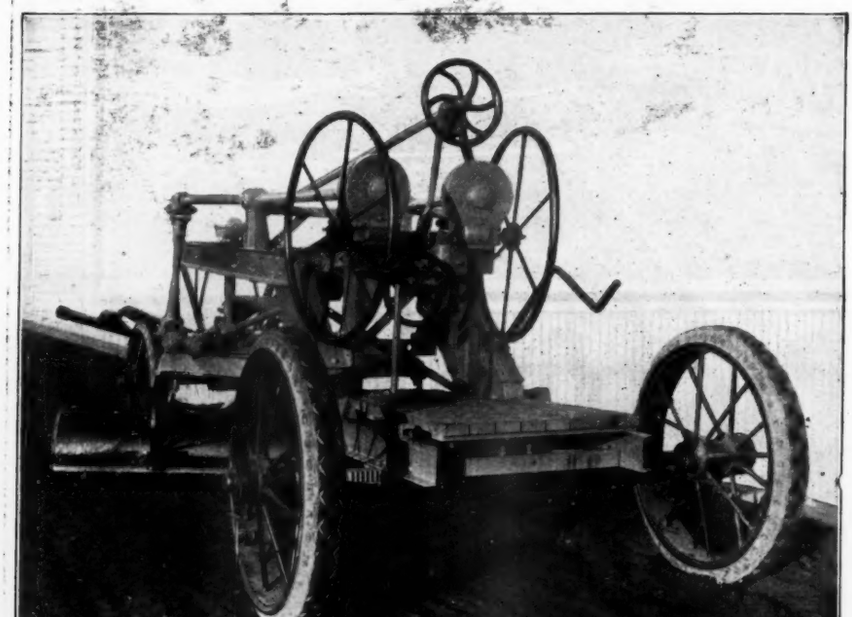
INDUSTRIAL WORKS · · · BAY CITY · MICHIGAN

pole-type series transformers or safety coils, and for series service with 2,500 to 6,000 lumen series lamps on standard series circuits not exceeding 2,500 volts.

GREYHOUND ROAD GRADERS

The Stockland Road Machinery Company, of Minneapolis, Minnesota, has produced a rubber-tied road grader which it calls the "Greyhound," designed by L. B. Sherman, of the company's engineering staff. The steering mechanism is a combination of the built-in type and the pole device. The hitch has been placed low so as to eliminate down pull when the hitch on the power is low and also to counteract any tendency of the front truck to tip backward. The entire front end of the grader is made heavier than standard construction to accommodate scarifier attachments and hold them to the ground. All gears are enclosed in dust-proof steel cases and may be run in oil or grease. The Alemite system of forced lubrication is used throughout. All bearings except those in the land wheels are of either bronze or babbitt and are protected with felt washers.

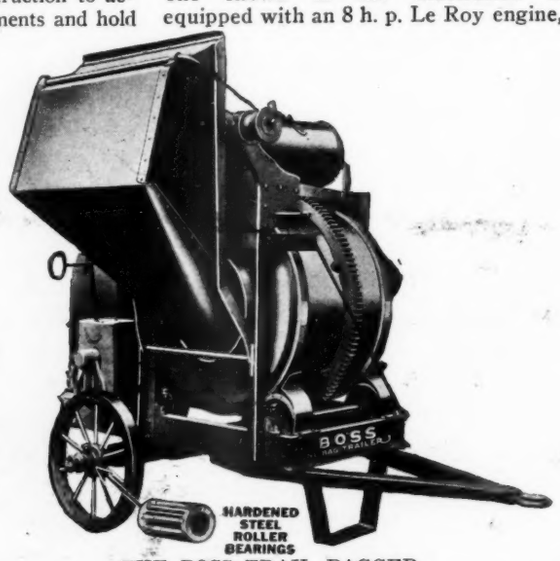
As compared with the Stockland Special Patrol, the frame of the Greyhound is 4½" higher and the wheel base is 10" longer, and the steering column has been raised so that the operator can get a better view of the work and still reach the steering wheel conveniently. The lifting arms are increased from 1¼" 2". The handwheels have been narrowed to 29" spread. The wheels are equipped with a 40x5 solid tire on the rear and 32x4" on the front. The bearings in the wheel are Hyatt heavy duty. The machine weighs 5000 lbs., the blade is 8 feet long and 16 inches wide. The frame is built of 6-inch channels.



GREYHOUND ROAD GRADER

BOSS TRAIL BAGGER

The American Cement Machine Co., of Keokuk, Ia., manufactures a two-wheel, one-sack mixer which it calls a "Trail Bagger." It is built of steel throughout, including truck, drum and frame, and weighs 2,990 pounds, or about 1,000 pounds less than the average mixer of this size. It is furnished with power loader or low charger. (The one shown in the illustration is equipped with an 8 h. p. Le Roy engine, with automatic power loader.) It has two wheels with solid truck tires 28 in. diameter, of the Goodrich truck type, pressed on, with hardened steel roller bearings in bronze cages. It can be towed at any reasonable speed behind a light truck. It has a special hitch so arranged that one man can lift and attach the mixer to its tow, with a ten-inch road clearance while being towed.



THE BOSS TRAIL BAGGER

CARRARA ZONE MARKER

CARRARA ZONE MARKER

The Carrara Paint Company of Cleveland, Ohio, furnishes a zone marker by which it claims that one man can paint from 4,000 to 6,000 feet of traffic line per hour. It has an adjustable reservoir and is equipped with an agitator to keep the paint thoroughly mixed. The rate of flow of paint is regulated by a knob on the handle bar. Two 4-inch brushes distribute and smooth out the paint.

TRAFFIC WHITE PAINT

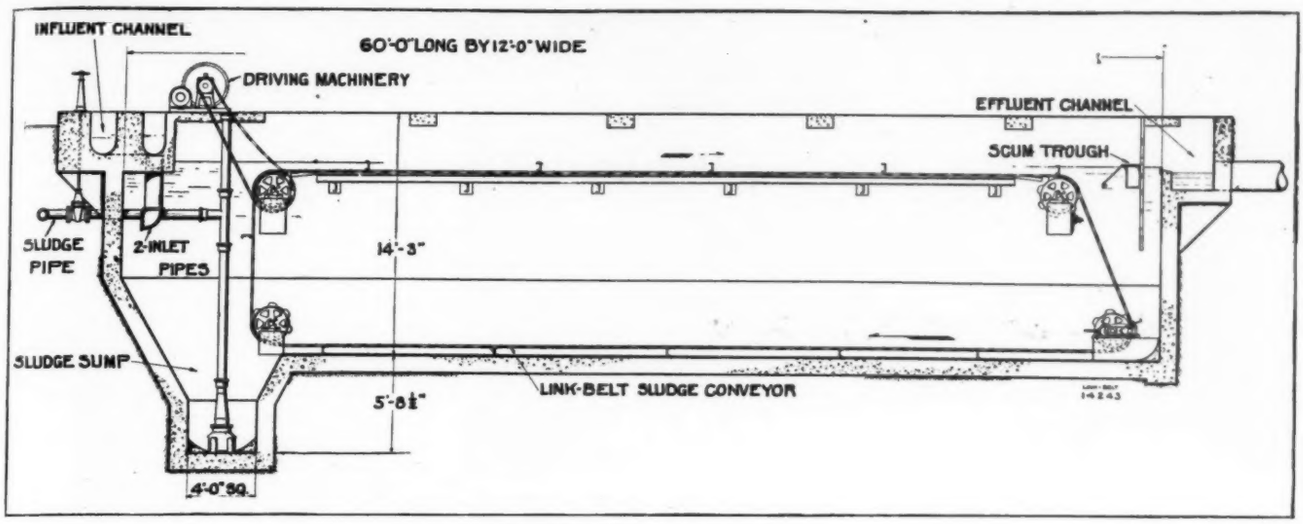
A test of DuPont traffic white paint was made recently at Knoxville, Tenn., where 4-inch lines were laid down at an average rate of 250 lineal feet per minute with a paint consumption of 7.6 gallons per mile. The paint was applied as a coat to a new concrete surface. At a temperature of 48 degrees Fahrenheit the paint was trackproof in 27 minutes.

CHAUSSE PORTABLE ASPHALT PLANTS

The Chausse Oil Burner Company of Elkhart, Indiana, manufactures a small portable asphalt plant for patch work in street repairs, designed for use by municipalities and contractors in laying hot asphalt, for repairing asphalt pavements, or resurfacing holes or filling cracks in concrete pavements. It is designed to heat sand, stone and asphalt for six cubic yards per day and has exceeded this output.

It consists of a gasoline engine, asphalt tank with capacity of about eighty gallons, tool heater compartment, rotating cascade sand dryer, open top batch mixer and four standard Chausse oil burners. The plant is mounted on a chassis which is self-propelling at low speeds, although not intended for traveling over long distances.

At the rear of the machine is a sand hopper loader which carries sand to the top of the storage vat, from which it may be released into a measuring hopper and thence into the drying drum. Three-fourths of a yard of damp sand can be dried in six to seven minutes.



Sedimentation Tank for Lakewood, N. J.

High Efficiency, Low Construction Cost and Simplicity of Operation —

are the ideals of every designer of sewage treatment plants. Sedimentation, either as the sole or preliminary treatment, is still the standard for most plants. The advantages of separate sludge digestion are such, that many engineers are using plain settling tanks with separate digestion tanks in preference to the two story tank.

Experience has proved that a comparatively narrow and long tank, from 10′-0″ to 12′-0″ deep is the most efficient, because it is easy to distribute the flow across the whole section of the tank. Link-Belt Sludge Conveyors, operating about 30 minutes per day, carry the sludge into the hopper at the influent end, from where it is withdrawn into the digestion tank. A three horse power motor will operate three conveyors, each 100′-0″ long.

Put your problem before an experienced Link-Belt engineer. Send for detailed information.

Other Link-Belt Products

Elevators and Conveyors for all materials
Coal and Ashes Handling Equipment
Locomotive Cranes
Crawler Cranes
Portable Loaders, Belt and Bucket types
Belt Conveyors
Car Loaders and Unloaders
Car Pullers
Silent Chain Drives
Roller Chain Drives
Transmission Machinery
Chains, Wheels, Buckets
Gears, Bearings, etc.
Send for Catalogs

LINK-BELT COMPANY

CHICAGO, 300 W. Pershing Road

PHILADELPHIA, 2045 Hunting Park Ave.

New York . . 2676 Woolworth Bldg.
Boston . . . . 49 Federal St.
Pittsburgh . . . 335 Fifth Ave.
Buffalo . . . 745 Ellicott Square
Wilkes-Barre, 826 Second National Bank Bldg.
Huntington, W. Va., Robson-Prichard Bldg.
Cleveland . . 329 Rockefeller Bldg.
Detroit . . . . 5938 Linsdale Ave.
St. Louis . . . 3638 Olive St.
Kansas City, Mo., R. 405, 1002 Baltimore Ave.
Denver . . . . 520 Boston Bldg.
Minneapolis, Minn. . . . Link-Belt Supply Co., 418 S. Third St.
Louisville, Ky. . . 321 Starks Bldg.
Ashland, Ky. . . . V. P. Dalmas & Co., 100 W. Winchester Ave.

2274

INDIANAPOLIS, 200 S. Belmont Ave.

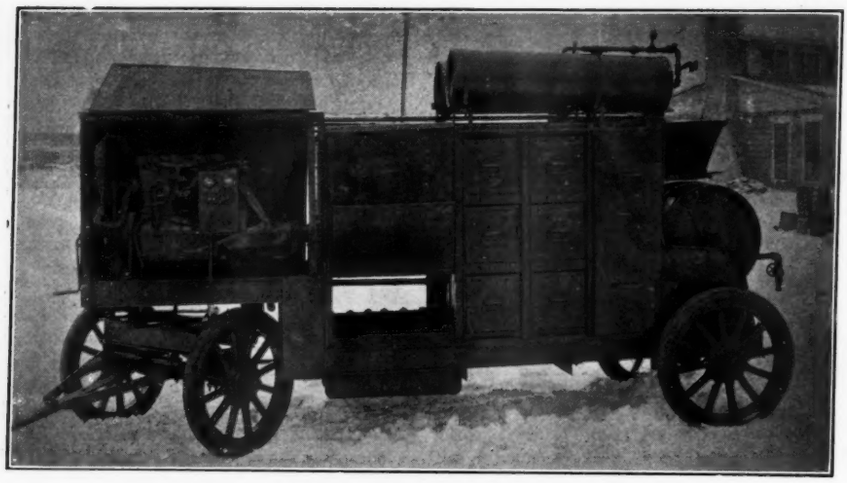
New Orleans . . 504 Carondelet Bldg.
Whitney Supply Co., Ltd., 733 Tchoupitoulas St.
Birmingham, Ala., 720 Brown-Marx Bldg.
Atlanta . . . . 24 Marietta St.
Toronto and Montreal, Link-Belt Limited

H. W. CALDWELL & SON CO.:—Chicago, 1700 S. Western Ave. New York, 2676 Woolworth Bldg. Dallas, Texas, 810 Main St.
LINK-BELT MEESE & GOTTFRIED CO.:—San Francisco, 19th and Harrison Sts. Los Angeles, 400 E. Third St. Seattle, 820 First Ave. S. Portland, Ore., 67 Front St.

LINK-BELT

50 THIS YEAR LINK-BELT IS FIFTY YEARS OLD

SEWAGE DISPOSAL EQUIPMENT



CHAUSSE PORTABLE ASPHALT PLANT

and brought to a temperature of about 400 degrees. It is then dumped into the open top mixer and hot asphalt is admitted through a measuring pump. There is no danger of burning the asphalt, and the mix takes place at about 350 degrees. There is sufficient heat radiation around the mixer to maintain small quantities of asphalt at proper heat for any length of time. The burners are so placed as to give adequate distribution of heat. Two of the burners are used with the sand dryer, the other two are under the tool heater compartment and the A. C. tank, and have a capacity of bringing eighty gallons of asphalt up to working temperature in about thirty-five minutes, when one burner is usually turned off.

The machine weighs six thousand pounds; is 12 feet overall, with standard tread, rubber tired wheels and roller bearings.

The heating requires about forty-five gallons per ten-hour day and three men are required to handle the full patching program. The operating cost is therefore said to have proven to be very low.

A LIGHT FORD TRUCK

The Ford Motor Company announces the recent production of a new light trucking unit, combining the standard Ford runabout and a pick-up body replacing the rear deck. It is recommended for contractors and others requiring rapid transportation of light loads. The all-steel body is securely attached to the frame of the chassis. It has rear door, adjustable chains, side flanges, and steel floor strips with sunken bolt heads. The inside dimensions of the body are 40¾ inches by 56 inches and height from floor to top of flare is thirteen inches.

VALVES FOR CAUSTIC SOLUTIONS

The General Electric Co. has solved the problem of producing stopcocks that will handle caustic solutions without sticking, by using Genelite as a facing for the rotating part of the valve. This material never seizes or flows, is self-lubricating to a certain extent and can be used with practically any solution that will not attack bronze. It is a synthetic bronze having uniformly distributed through it about 40% of very finely divided graphite.

RIX FORDSON HOIST AND LOADER

The Squier-Rix Company of Milwaukee, Wis., manufactures a combination hoister and loader adapted to lowering sewer pipe into ditches with the hoister and then filling the ditches with the loader attachment. It also has numerous other uses for contractors. The equipment is designed to fit on the Fordson tractor without the necessity of drilling holes. The power is taken off from the regular Fordson standard take-off by means of a belt. The elevating mechanism is of the regular double pulley and cable type, equipped with an 8 in. x 8 in. drum carrying one hundred feet of 5/16-inch cable. A self-locking device holds the load immediately on release of power. To prevent over-hoisting, the control lever is automatically thrown into neutral by a limit switch. It is operated by means of one lever conveniently located near the operator's seat. The framework is of channel and angle iron construction.

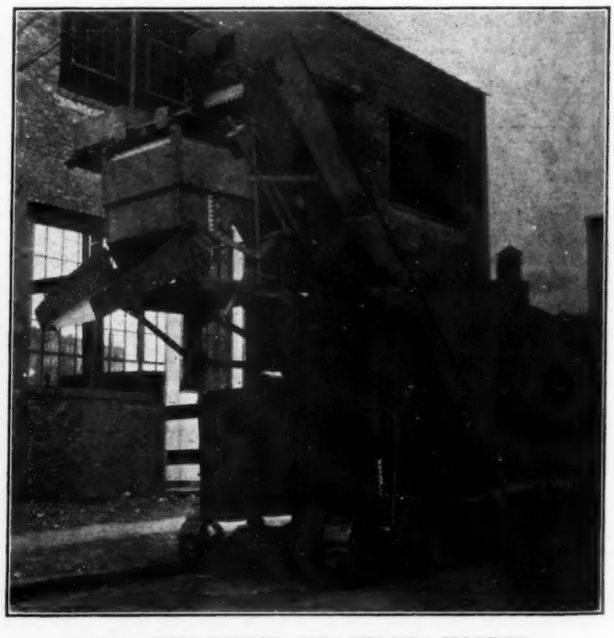
When used as a loader, a special attachment consisting of a dipper and dipper stick is mounted on the hoist boom. The capacity of the standard dipper is ¼ yard.

HAISS PRECISION HOPPER

The George Haiss Mfg. Co., of New York City, announces as its latest development a measuring hopper equipped with a strike-off device for truck loaders, called the "Precision Hopper," developed for the most exacting users of concrete aggregate measuring equipment. The manufacturer claims the following advantages: It can be set accurately at any capacity; has an accurate strike-off; excess from one batch is returned to hopper for the next; entirely handled from operator's platform; capacity setting read directly on scale in plain sight; no more material can be put in the hopper after striking off; it cannot be dumped until struck off; no material can be put into the hopper unless the dumping gate is closed.

It consists of three parts, a base section to which is attached a chute which, when raised, forms a gate; the box

LIGHT FORD TRUCKING UNIT



HAISS "PRECISION" MEASURING HOPPER

A line of Cast Iron Pipe supplying Selkirk Yard near Albany, N. Y.

Preferred by Discriminating Users

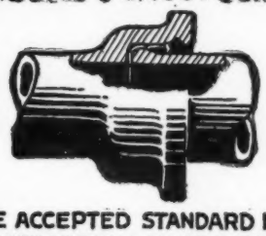
The railroads are among the largest consumers of water. Water is used for engine supply, for boiler water in power plants, for car washing and for passenger use. Many roads operate complete pumping and water treatment plants that are as large as those supplying good-sized cities.

Their supply must not be subject to shut-downs for repairs to pipes because continuity of water supply is necessary to uninterrupted operation of trains. Contamination of the supply would bar its use for drinking purposes. Cast Iron Pipe is used for railroad supply lines because it can be counted on for continuous service, and can be relied upon to deliver the water in as good sanitary condition as it enters the pipe.

THE CAST IRON PIPE PUBLICITY BUREAU, Peoples Gas Building, Chicago

CAST IRON PIPE

THE BELL & SPIGOT JOINT



THE ACCEPTED STANDARD FOR UNDERGROUND CONSTRUCTION

Our new booklet, "Planning a Waterworks System," which covers the problem of water for the small town, will be sent on request

Send for booklet, "Cast Iron Pipe for Industrial Service," showing interesting installations to meet special problems

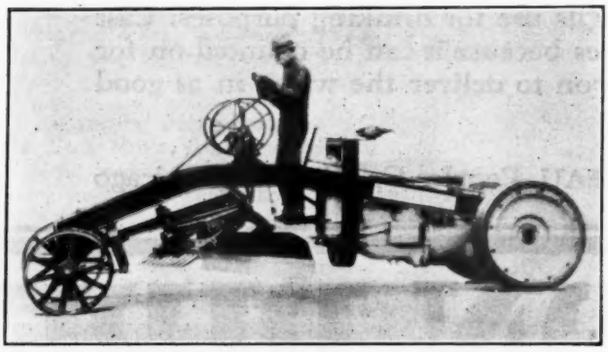
section which telescopes over the base and can be set for the desired capacity, and which carries the plate for holding the struck material; and third, the strike-off in the form of a guide box, which, when pushed to the side, cuts off the excess material and carries it over onto the plate, the material being pushed into the hopper when the strike-off is brought back to filling position. A scale of cubic feet is put on each side of the base section so that the lower edge of the box section indicates the capacity setting. Rollers are provided for the strike-off and the cut-off is made by an inclined toothed plate. One lever for operating the strike-off and one for lowering the gate chute are provided at the operator's platform.

A plate attached to the strike-off covers the top of the box section when the precision hopper is struck, and a bell crank attached to the gate chute interlocks with the strike-off so that the gate cannot be lowered until the batch is struck, and the strike-off cannot be brought back until the gate is closed.

The standard capacity of the precision hopper is 12 to 21 cubic feet, but 7 to 12 cubic feet and 15 to 25 cubic feet are made special.

THE 1925 WEHR GRADER

The Wehr Company, of Wilwaukee, Wis., announces the following improvements in its 1925 model one man power grader. The head casting is larger and stronger, weighing 80 lbs. more than before. The heavy-duty Lavine steering gear is now bolted rigidly to the frame, preventing bending of steering column when driven against a curb, etc. The brackets supporting the lifting worms are twice as strong as before; the wear from the thrust of the lifting worm is taken by a stationary bronze collar, eliminating wear on main casting. The large pin that supports the lifting arm is made on an eccentric, permitting a perfect fit and taking up wear between worm and lifting arm. The blade can be lifted to clear the ground 12 inches. The wheel base has been lengthened 6 in., allowing the blade to be turned to any desired angle without interference with either front end of tractor or radius rod yoke. The operator's platform has been raised 4 in., allowing more clearance for turning the blade as well as tilting it. Lifting arms or rods have been increased from 1 in. to 1¼ in. To make the operation easier and the operator more comfortable, sotter springs support the platform, the seat is adjustable to the length and weight of the operator, and the lifting wheels are 3 in. longer.



WEHR NEW HEAVY-DUTY GRADER

BRILEY ONE-MAN MAINTAINER

The Briley Manufacturing Co. of Dubuque, Iowa, makes a one-man road maintainer to which it has recently added a few improvements, such as an extension of the hand wheels and operating rods to the rear; and with a platform on the rear as well as in front, it can be operated by a man at either point. It has three cutting blades 13-ft. long, set at different angles, with an extreme cutting width of 13-ft. 8-inches, which carry the material a distance of forty feet, pulverizing and evenly distributing it over the entire road. Two hand-wheels operate independently to adjust the height of the blade on each side of the machine. The frame is of 8-inch channels, well braced and riveted. In addition to the blades, a rock kicker carries oversize rock from the traveled roadway and deposits it on the shoulder of the road or in the ditch.

A 10-ft. maintainer carries 10-ft. blades, weighs 2,950 lbs. and requires 12 horsepower traction. A 14-ft. machine has a blade 13-ft. long, weighs 3,800 lbs., requires a 16-horsepower traction. A 17-ft. has blades 13 ft. 6 inches long, weighs 4,000 lbs. and requires 18 horsepower traction. Either straight or concave blades can be furnished; also roller bearings and rubber tires.

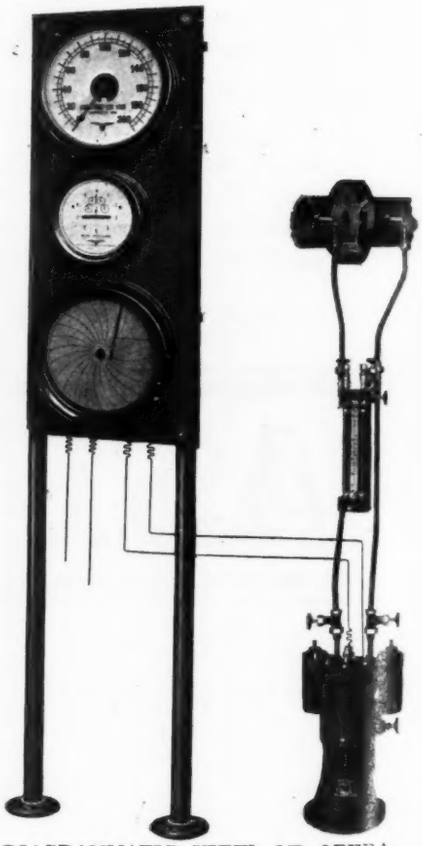
REPUBLIC FLOW METER

The Republic Flow Meters Company of Chicago, Illinois, manufactures a meter having somewhat the principle of the Venturi meter but the change in velocity is produced by means of a thin plate orifice. It is claimed as the advantage of this that it cannot collect scale and therefore does not develop a gradual increase of meter readings due to gradual increased velocity, and is much cheaper to manufacture. It can be applied to practically all fluids except sludge or sewage. The orifice plate can be inserted between flanges in the pipe line, or the orifice can be furnished with flanges and the necessary pipe section; and thus it is not necessary to shut down the line for any length of time to install the meter, an hour or so at night ordinarily sufficing. If a flange is not available for the installation, the orifice may be put into the bell of a B. & S. pipe. The plate is made of monel metal which withstands the action of practically all chemicals as well as corrosion and abrasion.

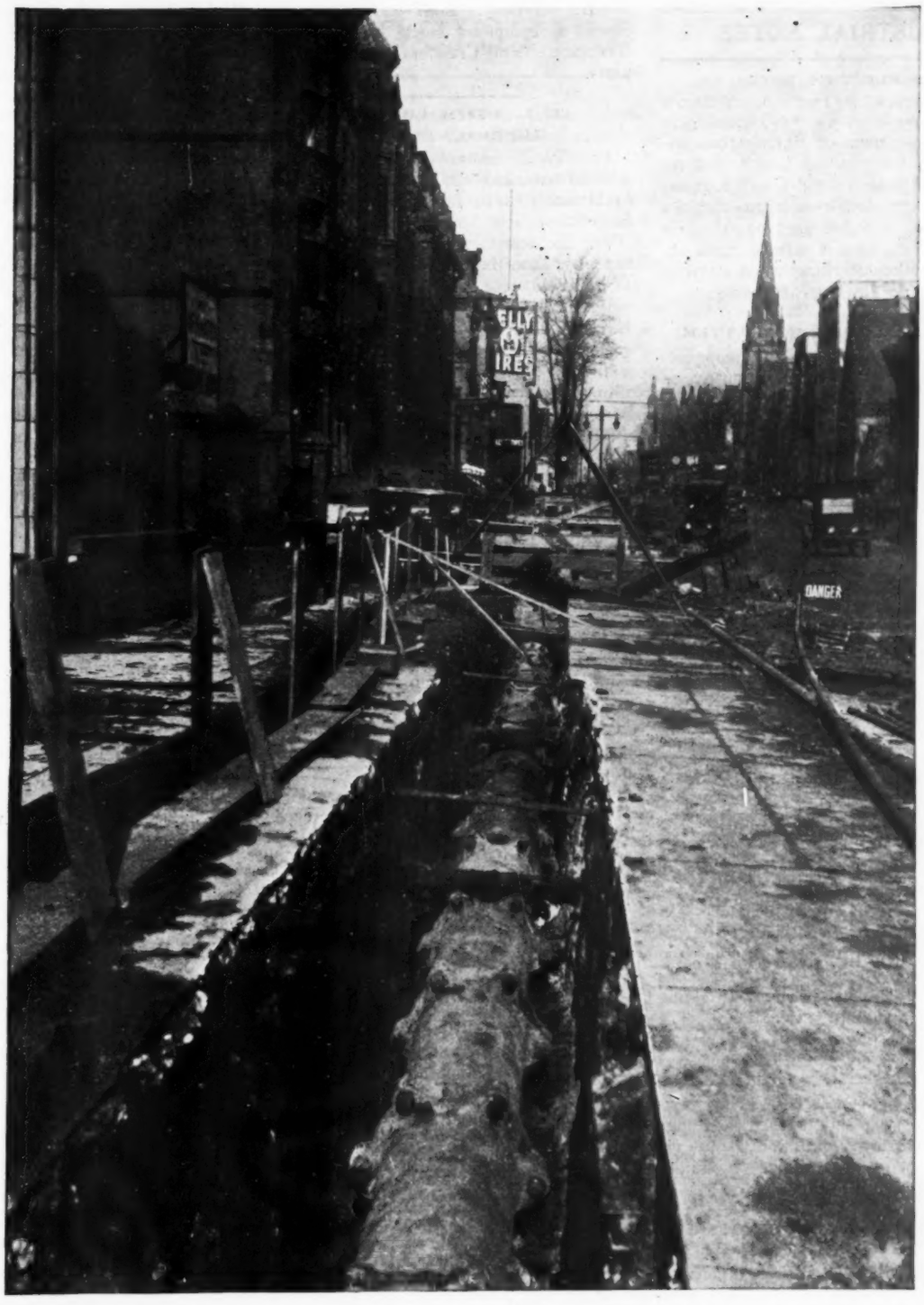
To effect change in capacity of the meter it is only necessary to change the orifice plate, which can be done in a few minutes.

Each meter is provided with instruments that give three readings, an indicator at the top of the panel board which shows the momentary flow; an integrator which records the total amount of flow during any period; and a graphic recorder at the bottom of the panel board which is equipped with a pen for making a 24-hour graph of water flow. They register in any desired units, usually gallons per minute.

Measurement is accomplished by means of an electric current, which is regulated by the differential pressure of the flow. Mercury in a manometer is raised in one tube and depressed in the other by the differential pressure and engages or disengages successively the ends of overhanging rods, thus adding to or cutting out resistances to which the rods are connected. Resistances are so divided by the contact rods that flow of the current in the fluid is directly proportional to the flow of fluid in the pipe. The recorder is operated by a solenoid support vertically, the core being connected at the top to the main pen staff through a pivoted jewel bearing, and at the bottom through a coiled spring member. The indicator is extremely sensitive to actual load changes as distinguished from momentary fluctuations which are damped out.



DIAGRAMMATIC VIEW OF OPERATION OF REPUBLIC WATER METER



PHILADELPHIA: This 20-inch Universal Cast Iron Pipe high pressure fire line after fourteen years of uninterrupted service, was taken up during subway construction.

Relaid and today is meeting the same exacting requirements.

"Universal" is the highest development in cast iron pipe—it makes its own joints. No lead, no pouring, no bell holes to dig. Tight, flexible, dependable.

Our nearest office is at your service.

UNIVERSAL CAST IRON PIPE

THE CENTRAL FOUNDRY COMPANY

Subsidiary of IRON PRODUCTS CORPORATION

New York, 41 East 42nd St. Chicago, McCormick Bldg. Birmingham, Age-Herald Bldg. San Francisco, Rialto Bldg. Los Angeles, Chamber of Commerce Bldg.

INDUSTRIAL NOTES

GAS-ELECTRIC BUSES

Last December two hundred gas-electric buses were ordered by the Philadelphia traction management of Philadelphia, using General Electric, equipment, and recently the Atlanta Motor Coach Co. has ordered fifteen double-deck gas-electrics with similar drive. This type of drive was selected because it permits rapid acceleration without jerking when starting, there being no shifting of gears.

BLAW-KNOX BINS IN SEATTLE

Circular steel storage bins manufactured by the Blaw-Knox Company of Pittsburgh have recently been installed at the Spokane Avenue plant of the Pioneer Sand & Gravel Company at Seattle, Washington. The plant of this company covers an area with approximately 300 feet of water front and 400 feet deep. There is a circular railroad track laid around the plant. Scows come in from the Sound right alongside of the dock and the material is handled from the scows to the circular bins or to ground storage. The bins comprise two of 85 tons capacity each and four of 135 tons each. These bins are loaded by means of a Link Belt 25-ton locomotive crane using a 1¼-yard Blaw-Knox "Speedster" bucket. At the present time this plant is delivering 1,000 yards a day, exclusive of the central mixing plant.

DORR CLARIFIERS AT KANSAS CITY

Four 200-foot Dorr Clarifiers are to be installed in the new Kansas City, Mo., water treatment plant, which are expected to remove continuously from eighty to ninety per cent of the suspended matter from 100,000,000 gallons per day of Missouri river water, giving a detention period of three hours. The largest previous installation of Dorr machines in a water treatment plant was 85 feet.

These clarifiers will be of the peripheral drive type and the settled sludge will be returned continuously to the river. The plant was designed by Fuller & Maitland.

WESTERN PAVING BRICK ASSOCIATION FIELD MAN

The Western Paving Brick Association has recently appointed as its field engineer, J. A. Shirley of Omaha, Neb., who will have his headquarters in that city. Mr. Shirley served with the 23rd Engineers in highway construction in France and for the past two years has been in charge of Road Construction with the Kansas State Highway Commission.

FULL-CRAWLER COMPANY

The Full-Crawler Company of Milwaukee, Wisconsin, announces the appointment of the H. R. Hooper Company of Youngstown Ohio, as distributors for Trackson equipment in the Cleveland territory, and the Motor Power Equipment Company of St. Paul, Minnesota, in the St. Paul and Fargo, N. D., territory. Both companies will carry a complete stock of standard Trackson Full-Crawlers and repair parts.

T. L. SMITH COMPANY REPRESENTATIVES

The T. L. Smith Company of Milwaukee has appointed I. E. Schilling Co. of Miami, Fla., its representative for that State.

For the territory in and around Kansas City, Mo., the company has appointed as representative, G. C. Kenney with office at 410 New York Life Building, Kansas City.

Both of these representatives will carry a full line of Smith Tilting and Non-tilting Mixers.

WATEROUS REPRESENTATIVE CHANGE ADDRESS

Howard W. Evans, Chicago representative of the Waterous Fire Engine Co. of St. Paul, has moved his office from 510 No. Dearborn St. to 728 Monadnock Block.

SUPERHEAT ENGINEERING DATA

The Superheat Company of New York and Chicago some time ago issued a hand book on the generation and use of superheated steam, and the sixth edition, revised, has just been published. It contains condensed data for steam power plants and operators, illustrating superheater arrangements, contains steam tables and so forth. A 16-page index provides convenience for ready reference.

STREET LIGHTING FOR SAFETY

The Kuhlman Electric Company of Bay City, Mich., has issued a bulletin entitled, "Better Street Lighting with Greater Safety," in which it describes the advantages of series multiple street lighting, especially as obtained by Kuhlman Series Multiple Transformers, a small transformer being installed at each lamp. The pamphlet contains descriptions of the system and the transformer, abundantly illustrated.

OLSEN TESTING MACHINES

The Tinius Olsen Testing Machine Company of Philadelphia, in Catalog No. 10, Part C, describes testing machines and instruments for cement, concrete and other road materials, these including compression and universal machines, impact testing, hardness testing, cement briquette testing of various types, compression machines for concrete blocks and cylinders, beam testing, sewer pipe testing, briquette molding and other machines. Also apparatus for micrometer measurements of extension and compression, deflection, etc.

HUBER 4-CYLINDER MOTOR ROLLER

The Huber Manufacturing Co. has just issued a catalogue describing their Four-Cylinder Motor Roller in great detail, with illustrations of all its parts. The company says that while this roller "has proven somewhat of an innovation in road roller design, there is nothing revolutionary or experimental about it."

QUANTITIES OF MATERIALS FOR CONCRETE

The second edition of Bulletin No. 9 of the Structural Materials Research Laboratory of Lewis Institute entitled "Quantities of Materials for Concrete," by Duff A. Abrams and Stanton Walker, has recently been issued. This comprises a series of tables of proportions and quantities for Portland cement concrete of comprehensive strengths ranging from 2,000 pounds to 4,000 pounds per square inch at 28 days using fine and coarse aggregates and varying slump tests. The tables are based on the water-ratio method of proportioning concrete.

This bulletin was first published in 1921 but has been out of print for several months. The opportunity offered by the issuing of a second edition has been taken to rewrite some of the material and increase some of the data.

AUTOMATIC ARC WELDING

The General Electric Company has issued a bulletin giving a resume of the uses and value of automatic arc welding, together with a description of the welding apparatus and generating equipment used, in an attractive twenty-page booklet illustrated by photographs of equipment and applications.

PARADON CHLORINATING APPARATUS

The Paradon Engineering Company of Long Island City, New York, has just issued Bulletin No. 13 describing Paradon Semi-Vacuum Chlorinating Apparatus types "D" and "DV." This chlorinator operates under a semi-vacuum in that the chlorine is measured and its pressure reduced in a positive pressure, after which it is drawn under a vacuum into the injector.

PAGE WIRE FENCE IN OREGON

Page Hi-Way Guard has been installed by Multnomah County officials along 530 feet of a steeply curved incline on the Canyon Road just outside of Portland, Oregon, because of numerous accidents there. Eight by eight concrete posts were used, set 10 foot centers, each post with four reinforcing rods extending thirty inches below the post and set in concrete.

ASPHALT FILLER FOR BRICK PAVING

The complete story of the use of asphalt filler for brick paving is told in the new edition of the booklet, "Texaco Paving Filler," published by The Texas Company. The text deals with the most modern methods of handling asphalt from the time it reaches the job until it lies in the joints between the brick. Before publication, the material for this booklet was submitted for criticism and suggestions to the National Paving Brick Manufacturers' Association, with the result that further improvement was made. Copies of this booklet may be obtained from The Texas Company, Asphalt may be obtained from The Texas Company, Asphalt Sales Department, 17 Battery Place, New York City.

NEWS OF THE SOCIETIES

Aug. 17-20—INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS Annual convention at Hotel Statler, Detroit, Mich.

Sept. 1-3—LEAGUE OF PENNSYLVANIA CITIES OF THE THIRD CLASS. Twenty-sixth annual convention at Sunbury, P enn.

Sept. 7-12—NEW ENGLAND WATER WORKS ASSOCIATION. Annual convention on board steamer on St. Lawrence River.

Oct. 3-13—PAN AMERICAN ROAD CONGRESS. To be held at Buenos Aires, Argentina.

Oct. 12-13—SOUTHWEST WATER WORKS ASSOCIATION. Convention at Tulsa, Okla.

Oct. 15-17—CALIFORNIA SECTION AMERICAN WATERWORKS ASSOCIATION. Sixth annual convention at Santa Cruz.

Oct. 26-29—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention at Des Moines, Iowa.

Jan. 11-15, 1926—AMERICAN ROAD BUILDERS' ASSOCIATION. Annual convention and Road Show at Chicago.

AMERICAN SOCIETY FOR TESTING MATERIALS

The Annual Convention of this Society was held at Atlantic City June 22nd to 26th. The attendance was unusually large, being about eleven hundred and twenty, of which about two hundred and fifty were women. In addition to the ten regular sessions of the convention, there were several score meetings of committees and sub-committees.

Among the general business of the convention was the establishing of memorials in the memory of Chas. B. Dudley, a former president, and Edgar Marburg, a former secretary; a Dudley medal to be awarded each year for the best paper calculated to advance the knowledge of materials, and a Marburg lecture to be delivered annually by a recognized authority in some field of material research. In addition, the convention adopted resolutions in recognition of the services to the engineering profession of Mansfield Merriman, who died a few weeks ago.

W. H. Fulweiler, chemical engineer of the United Gas Improvement Company of Philadelphia, was elected president, and Professor H. F. Moore of the University of Illinois as vice president.

A large part of the committee work of this society has to do with specifications, and committee reports were submitted and discussed on specifications for cast and wrought iron, steel, ferro-alloys and non-ferrous metals. Specifications were also discussed dealing with coal and coke, slate, brick, timber, rubber products, cement, concrete, road building materials, lime and other materials. There were also technical papers, those of special interest to public works engineers dealing with brick, corrosion, asphalt mixtures, concrete and cement.

The committee on brick approved of the reduction to four of the number of paving brick sizes which had been brought about chiefly through the efforts of the National Paving Brick Manufacturers Association. Prevost Hubbard and F. C. Field, of the Asphalt Association, reported a laboratory test for stability of asphalt consisting in the load required to force a hot mixed ashpalt-sand briquet through the orifice. Henry M. Milburn of the United States Bureau of Public Roads described a test for the same purpose consisting of the decrease in height of a specimen effected by a constant load while at constant temperature. Another test in which the stability is measured by the extrusion of a heated specimen through the sides of a mold under a given load was described by W. J. Emmons and B. A. Anderton, also of the United States Bureau of Public Roads. Field tests on pavements made by determining the penetration of a steel ball of standard size and dropped through a given elevation were described by H. L. Howe, testing engineer for the city of Rochester, N. Y. In discussing these suggested tests, some engineers doubted their satisfactoriness from a practical point of view, G. H. Perkins of Warren Brothers stating that the tests should more nearly approach actual road conditions of impact and pressure to be of the fullest value.

In connection with concrete tests, F. H. Jackson and Geo. Werner, of the United States Bureau of Public Roads, described a new test for consistency which has already been referred to in the technical press during the past few months. A conical hopper having a capacity for about fifty pounds of concrete is mounted with its lower end twelve inches above a circular plate twelve inches in diameter which rests upon an ordinary spring scale. When the bottom of the hopper is opened, the concrete falls freely onto the plate and the more fluid the concrete the less the amount that remains on the plate. The amount so remaining is weighed by the scale on which the plate rests. It appeared to the observers that the weight retained bears a close relation to the water-cement ratio of the concrete and also to the compressive strength; giving more reliable results on these points than the slump test. The paper did not pretend to finally recommend this but was largely a report of progress.

H. S. Mattimore, of the Pennsylvania State Highway Department, described tests made with the use of alumina cement in road construction which seemed to indicate that concrete made with this cement should not be wet down as soon after placing as is commonly done with portland cement, but that the time for this wetting should probably be prolonged from five to seven hours after placing. Another paper on cement was one by A. T. Goldbeck, of the United States Bureau of Public Roads, entitled "Requirements of Cement for Modern Highway Construction." Several points were emphasized in the discussion, among them being the lack of uniformity of the product from the same mill as well as from different mills, indicating carelessness or lack of proper mill control; failure of the standard tests to reveal the rate of hardening of concrete, etc. Duff A. Abrams came to the defense of cement stating that the possible failure of cement to meet ideal requirements was of less practical importance than deficiencies of concrete due to other causes.

THE AMERICAN ASSOCIATION OF ENGINEERS

The 11th Annual Convention of this association met at Orlando, Florida June 2—5. Approximately one hundred and fifty members were present, forty-eight of them being delegates. A large part of the time of the convention was occupied with committee reports. The authority of the Board of Directors was questioned by a group of chapters which resulted in some rather heated discussion, but the matter was thrashed out in an open session of the Board and apparently harmony was restored.

Among the Committees reporting were those of Employment, Insurance, Student Membership, Ideals and Objects, Public Service, Practice, etc.

The directing manager reported that the membership had been declining during the past four years until on December 31, 1924 it had reached 7000 fully paid-up members. On May 20th of this year the official total was 8,263, there being a continuing increase in membership, partly due to new members but still more to reinstatements. During the fiscal year ending March 31st the operating expenses had exceeded the income, owing partly to the reduction of membership as well as to a deficit of the association's employment department and the cost of publishing a directory of members.

Although several amendments to the constitution were suggested, none of them was adopted, on the recommendation of the resolutions committee. A new emblem was adopted, being in the shape of a rectangle and containing the name of the association in gold letters on a blue background.

The officers elected for the ensuing year were: Dr. D. B. Steinman of New York City as president; O. Laurgaard of Portland, Oregon and W. R. Harris of Chicago as vice presidents; M. E. McIver of Chicago as acting secretary; H. W. Clausen of Chicago as treasurer and Harold Almert of Chicago as directing manager. As national directors there were elected—O. H. Kneen of Seattle; Donald M. Baker of Los Angeles; C. J. Ulrich of Salt Lake City; H. A. Wagner of Mayer, Arizona; A. A. Prendergast of St. Paul; R. S. Kellogg of Chicago; A. G. Culverhouse of Birmingham, Ala.; H. J. Spelman of Huntington, W. Va.; A. M. Knowles of New York City; E. I. Gardiner of Boston, and Arthur Richards of Chillicothe, Ohio.

WESTERN SOCIETY OF ENGINEERS

The annual meeting of the Western Society of Engineers was held on June 3rd with about one hundred and sixty members in attendance. The total membership is now 2,478, a net gain of 144 during the year. The meeting presented the Washington award to J. Waldo Smith, announcing that an addition of $2000 had been made to the fund by John W. Alvord. The three Chanute medals for the best papers were presented to Paul L. Battey for his paper entitled "Mechanical Equipment of a Railroad"; to Walter A. Shaw for his paper "Shall Public Service Be Rendered by Regular Monopolies"; and to the late John F. Hayford for the paper "Establishment of Isostasy."

E. T. Howson, the retiring President, reviewed the achievements of the previous year and Judge J. H. Wilkerson gave an address on the duty of the professional man as a citizen. It was announced that during the year thirty-eight technical meetings had been held with a total attendance of 6,717; also that the library now contained 9000 volumes, an addition of 600 having been made during the year; a new catalogue of the library to be completed before the end of this year. Abut $5000, or 12% of the funds of the society, had been spent on the library.

PAN-AMERICAN ROAD CONGRESS

The American delegation for the Pan-American Road Congress to be held in Buenos Aires, Argentina, on October 3-13, will sail from New York September 3rd on the Grace Line steamer Santa Anna. Stops will be made in Panama, Peru and Chile. From Valparaiso, Chile, the Andes will be crossed by rail and it is expected to reach Buenos Aires about October 1st. During the Congress, visits will probably be made to Montevideo, Uruguay, as well as to other cities in Argentina. On the return trip the delegation will probably stop at Sao Paulo and Rio de Janeiro, Brazil. New York will be reached on November 11th. It is estimated that an allowance of $1500 per person will be ample for the whole trip.

AMERICAN ROAD BUILDERS' ASSOCIATION

The annual convention of this association and the Road Show will be held in Chicago, as already announced, and the date has been set as January 11th-15th, 1926. The Road Show will be held in the Coliseum and adjoining buildings. The place for holding the technical and business sessions has not yet been decided upon.

W. H. Connell, the new president of the Association, has anounced that the convention will be carried on in two divisions, one covering the engineering side of road building, and the other the construction side. These two divisions of the convention will be in session simultaneously in adjacent rooms. By handling the program in this manner, those interested in engineering can devote their entire time to engineering subjects, while those whose main interest is in construction may keep their attention fixed on that phase of the work.

An effort will be made this year to increase the attendance from foreign countries by issuing official invitations requesting other nations to send delegates and special arrangements will be made for their entertainment. Invitations also will be extended to the Pan American Highway Commission and to the delegates who attend the Pan American Road Congress in Buenos Aires this fall.

ENGINEERS SOCIETY OF PENNSYLVANIA

This society has elected as officers for the ensuing year Frank A. Slack at Harrisburg as president, Thomas M. Kelker of Harrisburg and R. Boone Abbott of Reading as vice presidents, and Theodore J. Gould as secretary.

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS

At the 17th semi-annual convention at Providence, R. I., June 24th, two papers of interest to sanitary engineers were: "Statutory Regulation of Stream Pollution and the Common Law" by E. B. Besselievre; and "Electrolytic Conductivity and Hydrogen Ion Control of Waste Disposal" by Henry C. Parker.

NEW HAVEN CHAPTER, AMERICAN ASSOCIATION OF ENGINEERS

This chapter has elected as president, Thomas K. Hendrick; as vice presidents, Lewis C. Smith and Chas. E. Mar; as treasurer, Julian F. Denison; as secretary, Philip Sellers, and as assistant secretary, Clarence I. Smith.

PERSONALS

Bedell, Arthur S., formerly state sanitary engineer of Utah, resigned to take up work with the New York State Board of Health. Larkin, W. H., has succeeded Mr. Bedell as sanitary engineer of the Utah State Board of Health.

Jewell, Albert H., formerly chief engineer of State Board of Health of Kansas, is now executive secretary of the Health Conservation Association of Kansas City, Mo.

Boyce, Ernest, has succeeded Mr. Jewell as chief engineer of the Kansas State Board of Health.

Watkins, J. S., formerly acting engineer of construction of the State Department of Public Roads of Kentucky, has been appointed first assistant state highway engineer.

Palmore, H. D., formerly second district engineer of Dept. of Public Roads of Kentucky, has been appointed engineer of construction by the department.

Partee, A. W., formerly first district engineer of the Dept. of Public Roads of Kentucky, has been appointed engineer of construction by that department.

Durham, Henry Welles, has been employed as engineer to plan sanitary works for Managua, Nicaragua, by R. W. Hebard & Co., which has been given the contract for the work by the Nicaraguan government.

Hall, J. D., for eight years borough engineer of Swisvale, Pa., died May 27, age 63 years. He is succeeded by his son, J. Lloyd Hall.

Gray, S. R., has been appointed city engineer of Chippewa Falls, Wis.

Odbert, E. W., has been appointed city engineer of Sturgeon Bay, Wis.

Cannon, Sylvester A., city engineer of Salt Lake City for twelve years past, has resigned that position.

Dibdin, W. J., an English sanitarian who introduced contact beds about thirty years ago, died on June 9th, aged seventy-four years.

Merriman, Mansfield, for many years Professor of Civil Engineering at Lehigh University but who retired in 1907, died on June 7th at his home in New York City, aged seventy-eight.

Travis, Dr. William O, designer of the two-story settling tank known as the Travis tank, died on May 4th at Hampton, England, aged sixty-eight years.

Benzenberg, George H., for twenty-five years city engineer of Milwaukee and a past president of the American Society of Civil Engineers, died on May 31st, at his home in Milwaukee, aged seventy-eight.

Valentino, John G., formerly superintendent of waterworks at Savannah, Georgia, has become southern sales representative for the Union Water Meter Co., with headquarters in Savannah.

Davis, Carleton E., for two years past manager of the Indianapolis Water Co., and for eleven years prior to that chief of the Bureau of Water of the city of Philadelphia, has returned to Philadelphia as manager of the Philadelphia Suburban Water Company.

Morse, Howard S., business manager of the Board of Education of Akron, Ohio, has succeeded Mr. Davis as manager of the Indianapolis Water Company.

Kiersted, Wynkopp, Jr., formerly assistant engineer of the Water Department at Kansas City, Missouri, has been appointed chief engineer and superintendent of that department.

Mullen, John H., formerly first assistant commissioner and chief engineer of the Minnesota State Highway Department, has resigned to go into private business, the firm name being Nelson, Mullen and Nelson.

Ellison, J. T., formerly second assistant commissioner of the Minnesota State Highway Department, has succeeded Mr. Mullen as first assistant commissioner and chief engineer.

Smith, Charles W, has recently been appointed city engineer of Portage, Wis.

Mead, Dr. Elwood, Commissioner of the United States Bureau of Reclamation, recently received the degree of Doctor of Laws from the University of Michigan.

Moss, Earle B., recently city engineer of Niagara Falls, New York, has resigned and is in Norway engaged in engineering work for the Union Carbide Company.

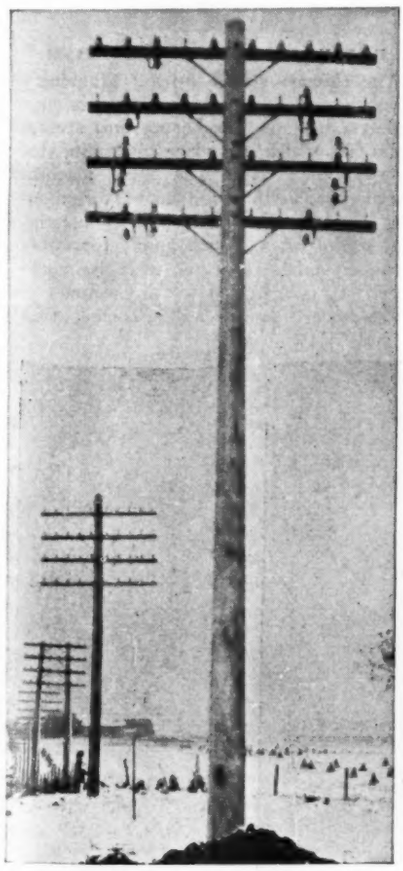
New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

HOLLOWSPUN LIGHTING STANDARDS

The Westinghouse Electric and Manufacturing Company manufactures reinforced concrete lighting standards or posts by what is known as the "Hollowspun" process of manufacture, being spinning or rotating the mold centrifugally at high speed. Reinforcing elements or cages are assembled in the steel molds and carefully prepared concrete is placed therein before the spinning begins. The product is a dense, compact mass resembling stone in appearance and exceptionally durable and tough. The reinforcing structure consists of vertical steel bars and spiro wrappings, the diameters of which are carefully calculated for each type of post, to resist stresses due to handling during transportation and erection as well as those when the standard is in use. The centrifugal action form a cylindrical opening which extends the entire length of the posts, while uniformity of contour is assured by the steel mold in which the posts are formed. The foundation of the post is generally monolithic with the post itself, which increases its stability as a street lighting standard.

Hollowspun street lighting standards are made in nine different heights or types and five different forms or styles. They are ordinarily made with a black and white aggregate that causes the concrete to closely resemble cut granite; or when desired an aggregate of red Wisconsin may be used.



HOLLOWSPUN TELEPHONE POST.

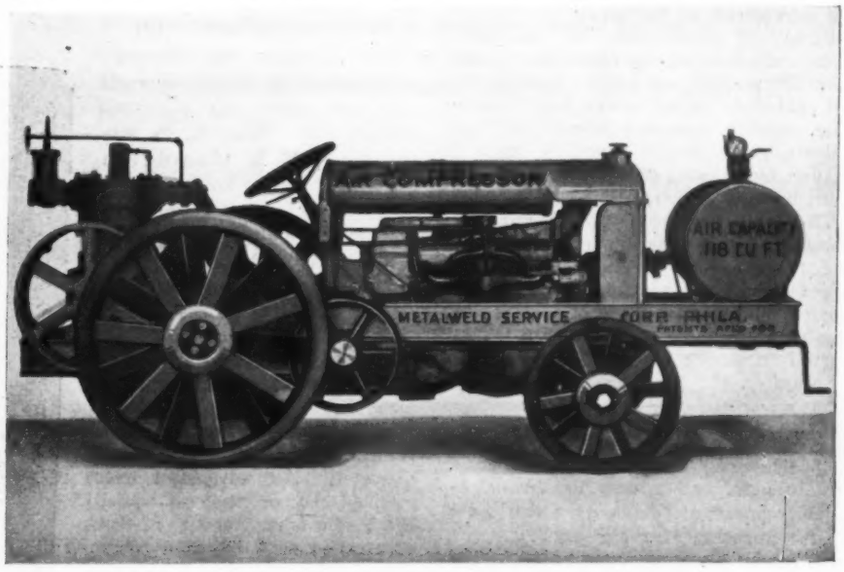
WATERPROOFING AND ANTI-CORROSIVE PAINT

Karl Fezer, of New York City, has recently been appointed American representative for "Inertol," a waterproofing and anti-corrosive paint manufactured by Paul Lecher of Stuttgart. This is recommended for use on both iron and concrete structures such as water tanks, standpipes, water pipes, filter plants, dams; also structures in sewage disposal plants such as settling basins and sludge tanks. The material is supplied ready for use in a thin, varnish-like black solution which is applied cold with ordinary paint brushes. Two coats are usually required, the second put on after the first has become thoroughly dry. Cement and concrete sufaces need only to be cleaned before being painted. Dry linseed oil paints can be painted over with "Inertol." Used in resevoirs and tanks, the material imparts to the water neither taste nor smell. Tests show that this material resists abrasion as of sand carried through a sewer, and so forth.

METALWELD AIR COMPRESSOR

The Metalweld Service Corporation of Philadelphia, Penn., manufactures an air compressor which it calls the "Runabout," with 118 cubic feet capacity and either belt or silent chain drive, convenient for use by the contractors in rock drilling, pavement breaking, trench tamping, riveting, caulking and other operations where air can be used. It will operate one large rock drill to a depth of 15 feet or two small drills to a depth of 8 feet, or two large pavement breakers, or three riveting hammers, or one sand blast. The "Runabout" is a self-propelling compressor built onto and operated by a Fordson tractor. The same compressor can be mounted on an all-steel frame and used as a trailer suitable for quarries and other semi-stationary purposes, when it is called a "Towabout."

The "Runabout" can be used as a tractor without dismantling the compressor. The compressor is of vertical two-cylinder construction, capable of delivering 118 cubic feet of free-air per minute at 100 pounds gauge pressure. The frame is of rigid I-beam construction. The machine can be furnished as an attachment only, which can be mounted easily on a Fordson tractor without any alterations being made. Parts can be obtained from any of the 10,000 Ford dealers in the country.



"RUNABOUT" AIR COMPRESSOR.

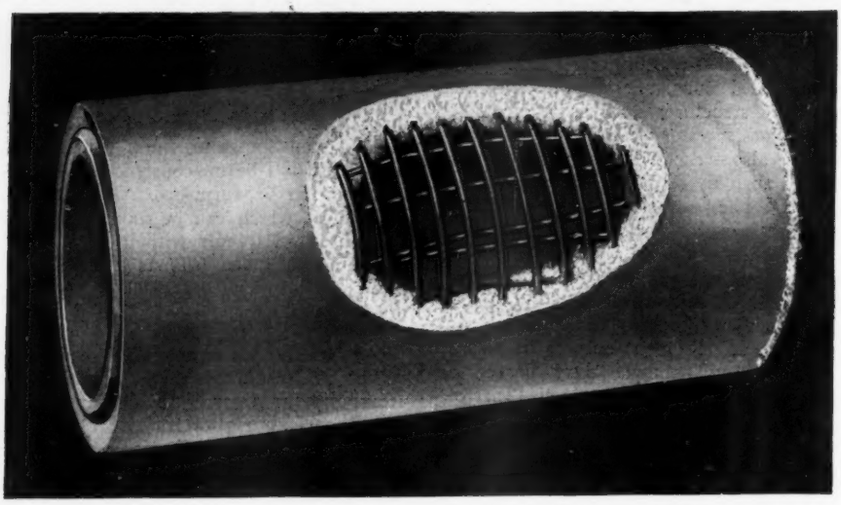
HUME CONCRETE PIPE

The American Hume Concrete Pipe Company, of Detroit, Michigan, holds the American rights for the manufacture, sale and distribution of Hume Concrete Pipe and of the machinery for manufacturing it. Pipe by the Hume process has been manufactured for a number of years, the patent originally being taken out by an Australian company, and fifty companies for manufacturing pipe have been established in Australia, New Zealand, England and other countries.

This is a reinforced concrete pipe, the peculiarity of which is that it is manufactured by employing centrifugal force, the pipe form containing a concrete mixture being revolved rapidly

and thus producing a dense concrete of uniform thickness of wall. Towards the end of the process the inside of the pipe is burnished by passing a steel bar over the surface. The mold containing the pipe is then taken from the spinning machine and steam dried for four or five hours, when the mold is removed and the pipe allowed to stand until used. The entire process of manufacturing the pipe ready for steaming requires about ten minutes.

The pipe is made with a groove sunk in each end, the two grooves, when the pipes are butted together, forming a diamond-shaped cavity which is filled with a plastic material when the pipes are laid. In addition a collar 6 inches long surrounds each joint, the annular space between collar and pipes being filled with semi-dry cement and sand rammed into place. The inside of a collar is rough while outside of the pipe is smooth and if any expansion or contraction takes place, the pipe slides inside the collar while the plastic material in the joint adheres to both pipes and stretches and compresses to the movement of the pipes.



PHOTOGRAPH OF 4 INCH, 150-POUND PRESSURE HUME PIPE, CUT OUT TO SHOW REINFORCING AND DENSITY OF CONCRETE.

Pipes of this make of standard thickness have been tested for more than 200 pounds per square inch internal pressure. It will stand any reasonable outside pressure when used as culvert pipe. Socket pipes, T and Y branch pipes, etc., can be centrifugally spun by this process.

The mold is revolved by being laid horizontally in friction rollers which are revolved at varying speeds, the speed increasing as the spinning proceeds. The machinery necessary is not cumbersome and can be readily transported from one place of manufacture to another.

NEW LONG STROKE PNEUMATIC DRILL

The Ingersoll-Rand Co., of New York, has brought out a new design of 4-cylinder pneumatic drills, of which some of the important features are:

A speed governor which limits the speed of the drill after it has passed the point of maximum horse power, thus preventing racing and extra consumption of air, excessive friction heat and resulting lubrication troubles.

Cylinder liners of special steel that are readily renewable. The cylinder case proper never wears out. Also, a space between cylinder case wall and liner prevents denting of cylinder.

Crank pins can not wear, for they are fitted with sleeves held stationary on the pin and taking all the wear.

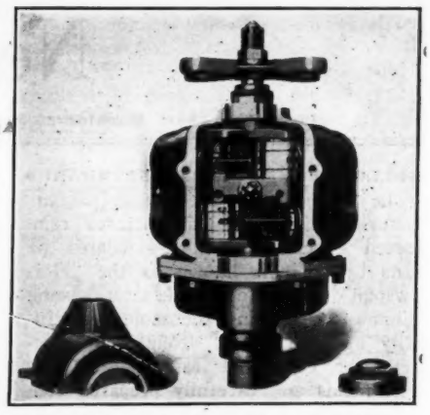
Lubrication of the crank pins is from the inside as well as the out.

The main valve is of large diameter with long bearing surfaces, air balanced to avoid wear on its bushing.

Gearing is of the helical type, giving stronger construction and smoother operation than straight spur teeth.

Connecting rods are of one-piece drop forgings.

Crank shaft construction permits the use of solid end connecting rods and renewable crank pin sleeves. The complete crank shaft with pistons and connecting rods can be assembled outside of the case and then inserted in place.



INGERSOLL-RAND LONG STROKE DRILL.
Crank case removed, showing great accessibility of crank chamber.

ALPICUL CULVERT PIPE

The Alabama Pipe Company manufactures a culvert pipe of cast iron which has a certain flexibility by reason of its construction. It is claimed that when the impact of a heavily loaded truck strikes such a culvert, even though laid with a thin covering of earth, the pipe compresses or yields with the load and thus greatly lessens the jar to the truck as well as to the pipe. At a recent test an 18-inch culvert was compressed one-half inch under five tons of weight, and on removing the pressure, returned to exactly its original diameter. An advantage over vitrified clay or concrete is that the weight is only about one-fifth as great—especially advantageous where there is a long haul from the railroad siding. No jointing material is required, as the culvert has an inter-locking joint. The pipe is made with longitudinal and circumferential reinforced ribs outside of the shell of the pipe. It is cast from merchant pig iron without the admixture of scrap. It is heated to 300 degrees Fahrenheit and coated inside and out with coal tar pitch varnish. Each section is half round and four feet long, with inter-locking tongue and groove joints in the side flanges, so that when installed there can be no movement of sections either lengthwise or sidewise. All sections are inter-changeable between top and bottom. Both side flange and bell and spigot interlocking joints fit up closely, making an even contact between upper and lower section and thus providing uniform strength.

SMOOTH BORE INSIDE.

RIB REINFORCED OUTSIDE.

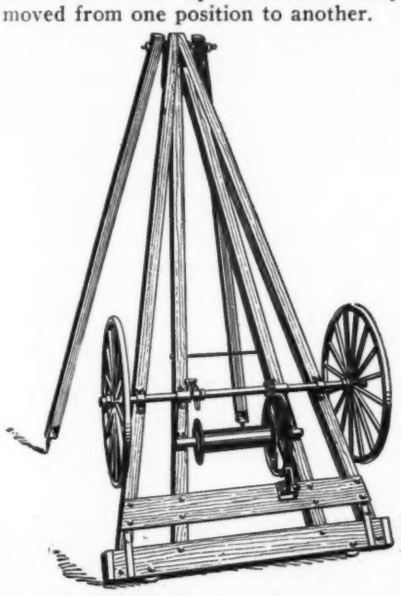
BORING FOR STUMP BLASTING

The Cowan-Alford Boring Machinery Company of Birmingham, Alabama, furnishes a machine for boring into stumps holes in which to place dynamite for blowing them out. The same machine can be used with a soil auger for planting trees, preparing hardpan for blasting and so forth. A 2-inch auger for either wood or soil is furnished with the equipment. It is operated by a Cushman 4-horse-power engine, water cooled, fric-

tion clutch, regular automobile type carbureter. The whole is mounted on a steel frame with a wooden platform securely bolted to it, carried on two 30-inch wheels in the rear and 24-inch wheels in front. Shafts are furnished for animal traction. The fifth wheel is constructed on the principle of a rocker arm, facilitating travel over rough ground. It is said that this machine will drive a 2-inch bit into sound, resinous wood at the rate of 30 inches in a minute and one-half. With about that depth of hole bored into the stump below the ground surface and using DuPont 40 per-cent dynamite, stumps can be broken up and removed readily.

NEW SULKY DERRICK

Joseph G. Pollard Company, Inc., of 146 Raymond Street, Brooklyn, New York, has just placed on the market a new type of sulky derrick designed especially for laying heavy pipe, the capacity being seven tons. It is built of the best selected spruce 4x6"x16' high, with a base of 6x8" pine. It has a spread of 7 feet at the bottom. It is equipped with two double wire rope blocks, bronze bushed, provided with 140 feet of wire rope. It is equipped with two wheels by which it is easily moved from one position to another.



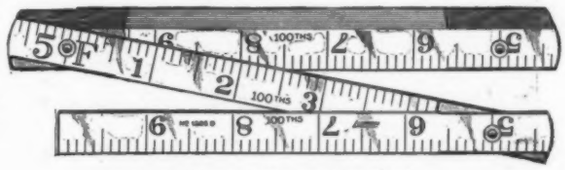
A NEW LUFKIN RULE

A folding aluminum rule graduated in 10ths and 100ths of feet is now offered by The Lufkin Rule Co., Saginaw, Michigan, supplementing its established line of aluminum rules in inch marking.

The 10ths rule is designed to meet the needs of civil engineers, surveyors, highway builders and tile layers, and will appeal to others in related lines of work. As its opposite side bears graduation in feet, inches and 16ths, the rule is suitable for all ordinary measuring. Graduations begin at same and on both sides, so a 10ths measurement can readily be converted into terms of inches, and vice versa.

This new rule is made in 6-foot length with 6-inch sections. It can be supplied either with or without end hook. This hook is just the thing for taking measurements out of arms reach and handy in all measuring. It readily folds up and remains flush with edge of rule. Zero point falls at inside of hook when open, and at extreme end of rule when hook is closed.

These aluminum rules are of special hardness, therefore hold their shape well. The dark sunken graduation show up distinctly. While very durable, the aluminum rule is light weight. It is accurate, and, having solid brass points, is rust proof throughout.



A NEW LUFKIN RULE

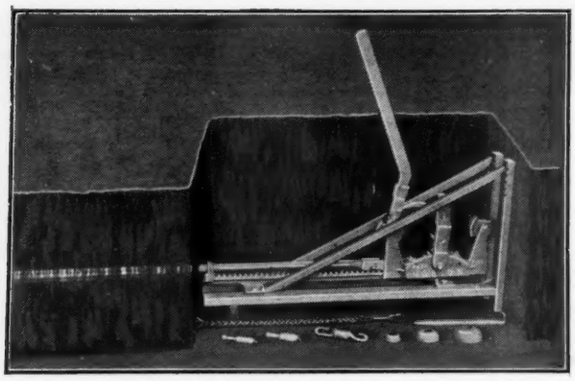
Who owns the telephone?

For seven carefree years young John Graves worked in the car shops at Orenville, spending his dollars as fast as he earned them. Soon after his promotion to foreman, he was married and moved to a little white house on Orchard Avenue. Life was happier than ever, but spare dollars were not more plentiful, especially after a third member was added to the family.

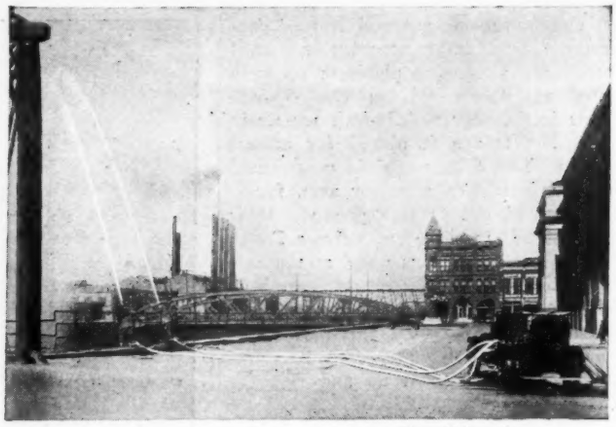
Then came a day when the plant superintendent showed John the wisdom of saving a part of his earnings, for the satisfaction it would bring, and for protection against emergencies and old age. He and his young wife, for the first time, learned the difficult art of economy, and finally they came to know the joys of saving and of safe investment.

Today John Graves, and many thousands like him, own the stock of the American Telephone and Telegraph Company. This company is owned by more people than any other, and the great majority of its owners—laborers, clerks, housewives, business men and others—have bought it with their savings. As its business has grown, the number of its shareholders has increased until now one out of every 45 telephone subscribers is also a stockholder.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES
BELL SYSTEM
One Policy, One System, Universal Service



MARION PIPE PUSHING MACHINE.



DE LAVAL PUMP AS A FIRE PUMPER.

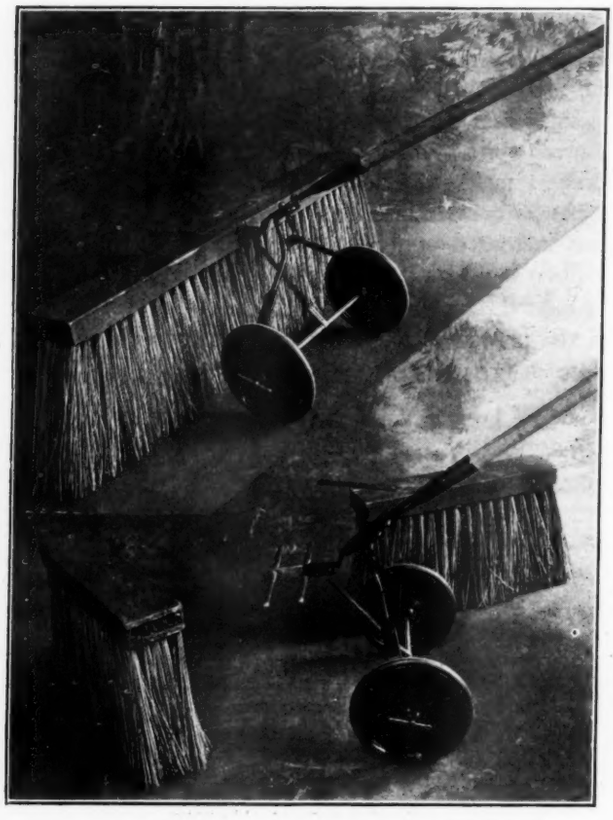
MARION PIPE PUSHING MACHINE

The Marion Machine Foundry and Supply Company, of Marion, Indiana, manufactures a pipe pushing machine for use in installing small service pipes, especially under paved streets, walks and lawns. It can also be used for cleaning small sewers and for placing pipes under cellar floors.

It is constructed of malleable iron and steel and consists of a gear-driven pack so arranged that it can be used to push either iron pipe or jointed tools or to pull the same. It eliminates most of the trenching and greatly reduces the labor bill, requiring only a trench 48 inches long by 14 inches wide in which to place the machine. It can be used as either a single lever or a compound lever.

NEW PUSH BROOM DEVICE

E. J. Mills, of San Francisco, California, has devised a push broom for cleaning streets which is supported by a carriage to which it is locked by a simple device. The carriage works automatically in that the forward push of the handle drops the broom to sweeping position, while a light pull to the rear raises the broom from the ground two or three inches. By means of a spring, the operator can control the pressure of the broom so as to exert as light or as heavy a pressure on the pavement as he may desire.



STREET BROOM MOUNTED AND UNMOUNTED.

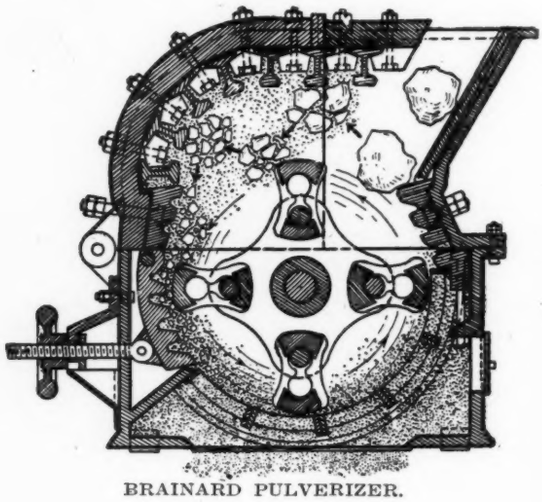
AN INEXPENSIVE FIRE PUMPER

Chief Christy, of the Pueblo, Colo., Fire Department, has assembled, for use in outlying sections of the city, a pumper that cost approximately half as much as the ordinary apparatus designed for this purpose. It consists of a DeLaval 5" single-stage pump with gas engine, mounted upon a one-ton truck chassis. This pump is designed to deliver 600 gallons per minute against 100 pounds per square inch when driven at 750 r.p.m.; that is, it adds 100 pounds to the pressure in the mains. It has a large overload capacity however, and has pumped as much as 1,250 gallons per minute. Under test, it discharged streams through two ⅜" fire nozzles under a total pressure of 130 pounds. The single-stage pump weighs less than the multi-stage pump employed in ordinary fire apparatus and is more simple in construction. This pump has been approved by both the Associated Factory Mutual Fire Insurance Companies and the Underwriters Laboratory of Chicago.

BRAINARD PULVERIZER

The Brainard Pulverizer Company of Chicago, Illinois, manufactures a pulverizer for all classes of free breaking materials such as limestone, slag, oyster shells, etc. Hammers of extra heavy manganese steel and reversible four ways revolve inside a large impact chamber which allows the material to pulverize by impact instead of grinding, reducing the power required and the upkeep expense to a minimum. The grates and principal wearing blocks also are of manganese steel. Grates can be removed and the size of the finished product governed by adjustable wearing blocks.

The machine is made in four standard sizes, with feed openings of 5 x 8 inches, 5 x 12 inches, 7 x 20 inches and 10 x 32 inches respectively. Capacities, in tons per hour, of the first size are two to three through a 1/8 inch screen and four to six through a 1-inch screne; for the second size, three to six tons and six to twelve tons respectively; for the third size, six to



BRAINARD PULVERIZER.

28 day concrete-in 24 hours

LUMNITE

reopens busy street intersection to traffic in 24 hours

FOURTEEN THOUSAND vehicles pass the corner of Tulane and Rampart Streets, New Orleans, every day. Public convenience demanded that this intersection be kept open, but repairs were urgently needed. The work was done with Lumnite Cement concrete—and the reconstructed sections were open to traffic within 24 hours.

At the end of 24 hours, the concrete had attained such strength that a 10-ton steam roller traveled its entire length without marking the surface.

Atlas Lumnite Cement makes 28-day-strength concrete in 24 hours, but it is not "quick setting." It allows the usual time for mixing and placing in forms. Lumnite is mixed and handled in much the same manner as Portland Cement and can be used wherever Portland Cement can be employed.

In addition to street and road paving, Lumnite is useful for machine foundations, factory floors, bridges—and any other work which requires 28-day concrete in 24 hours.

THE ATLAS LUMNITE CEMENT CO.

25 Broadway, NEW YORK CITY

134 So. La Salle St., Chicago, Ill. 2000 First Ave., Birmingham, Ala.

✔ *and mail this coupon* TODAY

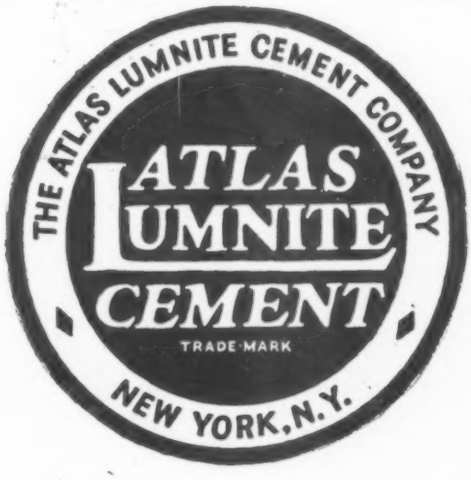
Please send your booklet on Lumnite, also detailed information on Lumnite's use for the work checked.

Beams	☐
Bridges	☐
Building Alterations	☐
Concrete Products	
(a)—Fence Posts	☐
(b)—Reinforced Pipe	☐
(c)—Reinforced Posts for mail boxes	☐
(d)—Roofing Tile	☐
(e)—Septic Tanks	☐
Conduits	☐
Culverts	☐
Curbs	☐
Dams	☐
Drill Borings	☐
Emergency Repairs in case of washouts, landslides	☐
Entrance Ways	☐
Floors	☐
Foundations	
(a)—Building	☐
(b)—Derrick	☐
(c)—Engine	☐
(d)—Machine	☐
General Reinforced Concrete	☐
Girders	☐
Grouting Granite Blocks	☐
Gutters	☐
Highway Intersections	☐
Industrial Roadways	☐
Mines	
(a)—Bulkheads	☐
(b)—Flumes	☐
(c)—Retaining Walls	☐
(d)—Roof Supports	☐
(e)—Shaft Linings	☐
Oil Wells	☐
Piers	☐
Railway Construction and Maintenance	
(a)—Bridge Approaches	☐
(b)—Bridge Piers	☐
(c)—Bridge Seats	☐
(d)—Platforms	☐
(e)—Roundhouses	☐
(f)—Track Base and Filling In	☐
(g)—Turntable Construction	☐
River and Harbor Construction	☐
Sewers	☐
Street and Road Paving and Repairs	☐
Subways	☐
Tunnels	☐
Underpinning	☐
Water Works and Drainage System	☐

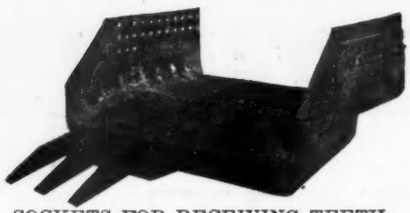
58

Name.....

Address.....



twelve tons and twelve to twenty-five tons; and for the largest size twenty to twenty-four tons and forty to fifty tons. These capacities are based on average operation on ordinary limestone but will vary according to the nature and hardness of the materials handled. Any size between 1/8 inch and 1 inch can be made by proper adjustment.



SOCKETS FOR RECEIVING TEETH.

CLARK DIPPER FRONT

The American Manganese Steel Company, of Chicago Heights, Illinois, manufactures a dipper front which it calls the "Clark Bridge Type" which is unusually strong and rugged. The bottom is a double wall supported by connecting ribs, which together form sockets for teeth. The ribs are so arranged that the front may be equipped with the number of teeth which will give the most efficient digging results. For example, a 2½-yard front has nine sockets and the operator may use either three, four, five or nine teeth, depending on the kind of material to be dug. This permits of arranging digging teeth made of square tool-steel bars alternating with pickup teeth made of Amsco cast manganese steel, set in the pockets. There are provided under the teeth a small renewable wearing band on the outside of the cutting edge.

The number and length of digging teeth may be changed readily according to conditions, and the teeth can be removed quickly and resharpened and replaced. After they become worn they may be brought forward by placing small blocks in the bottoms of the pockets.

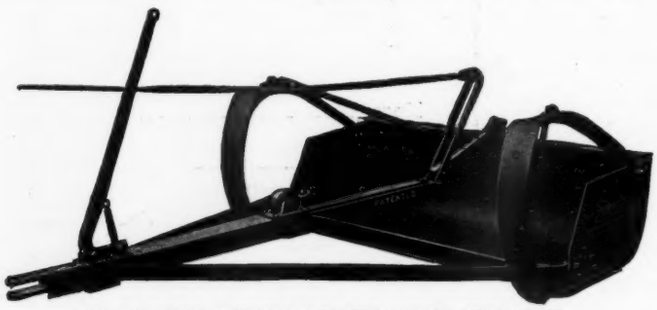
The front is made perfectly flat and is thus able to make a smooth, even cut. The cell-like or bridge type construction renders buckling of the bottom impossible.

CLARK BRIDGE TYPE DIPPER FRONT.

SCHAEFER AUTOMATIC TARCTOR SCRAPER

The Gustav Schaefer Wagon Company of Cleveland, Ohio, manufactures an automatic one-man tractor scraper for which it claims as special features: Simplicity, any tractor driver of ordinary skill controlling the various operations from the tractor seat; safety, because all moving parts are back of the driver; and strength, because the scraper is built especially for tractor use. It is made in four sizes—4, 5, 6 and 7 feet wide, hauling and dragging about 13 cubic feet, 16 cubic feet, 20 cubic feet and 25 cubic feet respectively. The 4-foot and 5-foot sizes are suitable for Fordsons and other light tractors. Loading, dumping, spreading and levelling are all controlled from the seat.

When driving to work, the trip lever is pulled and the tractor driven forward until the bowl is in a vertical position and rides on its shoes. To load, back the tractor two feet to allow the scraper to drop into position. Then pull the loading lever forward by means of a rope until the scraper is filled. Then let go and drive to dumping place, where the earth can be dumped quickly all in one pile by pulling the trip handle and holding it forward until the bowl is pulled up onto its shoes in a vertical position. The earth can be spread evenly in either of two thicknesses; pull trip lever and let it go immediately to engage the first spreading stop, and repeat the operation to use the second stop.



SCHAEFER AUTOMATIC TRACTOR SCRAPER.

U. S. CIVIL SERVICE EXAMINATIONS

Assistant Scientific Aid and Junior Scientific Aid.—Applications received until July 25. To fill vacancies in the Departmental Service, Washington, D. C., including the Bureau of Standards. Entrance salaries $1500 and $1320 respectively, with possible advance to $1860 and $1680. Applicants for position of assistant may select any of the following for examination: Advanced general physics, ceramics, chemical engineering, civil and mechanical engineering, electrical engineering, paper technology, physical metallurgy, physics and chemistry, or textile technology.

Assistant Chief Accountant-Engineer, Senior Accountant, and Accountant.—Applications received until July 28. To fill vacancies in the Department of Agricultural for assignment to duty with the Federal Power Commission. Entrance salaries $3,800, $3,300 and $3,000, respectively, with possible advancement to $5,000, $3,900 and $3,600. To make field examinations of the accounts and affairs of electric light and power companies and others licensed under the Federal Water Power Act, to determine their observance of the rules and regulations, prepare data relative to cost or value of investment, take active part in proceedings before State and other regulatory bodies concerning valuation, accounts, depreciation, etc.

Associate Cadastral Engineer.—Applications received until August 4. To fill a vacancy in the General Land Office, Department of the Interior, with headquarters at Denver and positions requiring similar qualifications. Entrance salary $3,000. To correlate surface and subsurface operations under coal, oil and gas leases; establish, retrace and relocate survey lines and corners; plot and map this work; make surface and subsurface surveys of mineral claims and leasing units and working in connection with the supervision of operations, output and royalties.

Associate Gas Engineer.—Applications received until August 4. To fill a vacancy in the Bureau of Mines for duty at Fort Worth, Tex. Entrance salary $3,000, with possible advance to $3,600. To act as assistant to plant superintendent, supervising power plant, gas distribution, and cost accounting reports; handling unclassified labor, and working up cost estimates.

Junior Engineer.—Applications received until August 8. To fill vacancies in various branches of the Government service throughout the United States. Entrance salary $1,860, with possible advance to $2400. Duties consist of such work as routine testing, drawing up plans for minor projects, performing field work, making computations, compiling reports, handling technical correspondence, etc. Competitors must qualify in at least one of the following: Aeronautical engineering, ceramic engineering, civil engineering (general electrical engineering, hydraulic engineering, irrigation and drainage engineering, engineering of materials, mechanical engineering, mechanical engineering (fuel combustion), naval architecture and marine engineering, and structural engineering.

At present there are five vacancies in the Bureau of Construction and Repair of the Navy Department at Washington, D. C., which it is expected will be filled from the register of naval architecture and marine engineering resulting from this examination.

INDUSTRIAL
CRAWLING TRACTOR CRANES

INDUSTRIAL WORKS · · · BAY CITY · MICHIGAN

INDUSTRIAL NOTES

LITTLEFORD BROS. EQUIPMENT CATALOGUE

Littleford Bros., Cincinnati, Ohio, have just issued a new 32-page catalogue which completely describes the Littleford line of road and street construction and maintenance equipment, which will gladly be sent to those persons who are interested.

Several new items which have been added to the Littleford line during the past several months are now in production. These include a new type of oil burning asphalt heater; an oil burning tool heater for asphalt paving work; a portable rotary sand drier with mechanical drive; a bituminous grout-mixing cart, all of which are made expressly for paving work.

The New Improved Maintenance Heater No. 69 with its eight outstanding and exclusive features is completely described. The regular Asphalt Heater No. 48 has been re-designed for additional efficiency in operation and new sizes have been added so that this style is now available up to 1,500 gallons capacity.

GENERAL SALES MANAGER FOR SULLIVAN MACHINERY CO.

The Sullivan Machinery Co., of Chicago, announces the appointment of Raymond B. Hosken as general sales manager of domestic sales, effective July 1. Mr. Hosken has been with the sales department since his graduation from the University of Michigan in 1910. Since 1921 he has been assistant to Howard T. Walsh, vice-president in charge of sales at Chicago.

LAYNE WELLS IN COVINGTON

The Layne-Central Company of Memphis, Tenn., has recently developed for the City of Covington, in that state, a water supply of approximately 2-million gallons per day, and in doing so has carried out its guarantee of a specified water supply. The first well failed to meet the guarantee and another well was drilled entirely at the expense of the contracting company.

The same company has also developed municipal well supplies for Leland, West Point, Greenwood and Louisville, Miss., and Milan, Tenn., together with supplies for industries in several Mississippi cities.

DORR COMPANY KEEPS RECORD ON GLOBE

Although the idea of keeping a geographical record of equipment installations by means of maps and vari-colored map tacks is by no means a new one, the Dorr Company, of New York City, has recently enlarged upon this idea in quite a novel way.

The company has had built a mammoth globe, or map of the world, 4 ft. in diameter and standing on its mounting about 5 ft. 6 in. high. The globe is so mounted that it may be revolved by a small motor.

The many fields to which Dorr equipment is applied are represented by different colored pins, and owing to the unusual size of the globe, the far-flung activities of the company are very forcibly illustrated. The fact that more than 2,000 pins are distributed through the 40 different countries will give some idea of the wide distribution of Dorr equipment.

The globe was one of the features of the recent Chemical Equipment Exposition, in Providence.

CONSOLIDATED DEVELOPMENT & ENGINEERING CORPORATION, INC.

This corporation, located at Jacksonville, Fla., announces that George W. Simons, Jr., for nine years chief engineer of the Florida State Board of Health, is now its chief engineer and secretary.

ROBERT WHITTEN MOVES TO NEW YORK

Robert Whitten, city planning and zoning consultant, announces the removal of his office from Cleveland to 175 Fifth Ave., New York City.

COPPER SULPHATE FOR WATER SUPPLY

The Nicholas Copper Company of New York, publishes a pamphlet written by Frank E. Hale, Ph.D., entitled "The Use of Copper Sulphate in Control of Microscopic Organisms." In the thirteen pages of this pamphlet, Dr. Hale has embodied a synopsis of the known information concerning various classes of algae found in surface waters and their characteristic odors, methods of applying copper sulphate, amounts necessary for destroying the different organisms and those fatal to the different kinds of fish.

CONTRACTORS', QUARRY AND GRAVEL MACHINERY

Roy M. Nelson & Co. have opened offices at 53 W. Jackson Blvd., Chicago, with a high grade line of contractors', quarry and gravel plant machinery, consisting of mixers, conveyors, loaders, buckets, concrete carts, industrial and quarry cars, track, new and relayer rails, switches, air compressors and pumps, both diaphragm and centrifugals. They are also representating Chas. Hvass & Co., New York, on their line of asphalt distributors, flushers, heating kettles, sweepers and road tools.

LINK-BELT CATALOGUES

The Link-Belt Company, of Chicago, Indianapolis and Philadelphia, has just published a 72-page book on sand and gravel handling equipment, intended for the use of those interested in the latest methods for producing sand and gravel. It discusses and illustrates various types of screening, washing and handling equipment used in the preparation of sand and gravel, with photographs of installations. It shows systems of washing and the application of elevators, belt conveyors, vibrating screens, crawler and locomotive cranes and both drive and conveyor chains.

The company also has issued an 8-page booklet discussing the operation and use of the Link-Belt gondola car dumper, with photographs and line drawings showing method of operation.

Copies of either book will be sent upon request.

AMERICAN-LaFRANCE BALTIMORE BRANCH

The American-LaFrance Fire Engine Company, Inc., announces the opening of their new direct Factory Branch for Sales and Service at 1300 Guilford Ave., Baltimore, Md. Walter W. Withers, who formerly was in charge of fire apparatus sales with headquarters in Washington, D. C., has been transferred to the new branch. The Baltimore Branch will carry a complete stock of service replacement parts.

SALES MANAGER FOR DORR COMPANY

The Dorr Company, of New York City, announces that D. S. McAfee, manager of the Sanitary Engineering department of the Dorr Company, has been appointed general sales manager and will in future direct the sales work of all departments of the company in the United States, Canada and Mexico.

Mr. McAfee joined the Sales Department of the Dorr Company in the spring of 1916, and since June 1923 he has devoted all his energies to managing the Sanitary Engineering Department.

FECHIMER, FRANK AND SPEDDEN

The Industrial Advertising Company on July 1st, joined forces with Emanuel G. Frank and Roland G. Spedden, the new firm taking the above name; also the complete office force and art and copy departments of the Industrial Advertising Company. The offices will be located at 415 Brainard St., Detroit, Mich.

BIG CONTRACT FOR STANDARD C. I. PIPE & FY. CO.

The Standard Cast Iron Pipe & Foundry Co., of Atlanta, Ga., has been awarded a contract by the city of Greenville, S. C. for more than $250,000 worth of 30-inch and 42-inch classes C and D bell and spigot water pipe, a total of 6,200 tons.

EDWARDS ROAD BUILDING EQUIPMENT

The C. D. Edwards Mfg. Company, Inc., of Albert Lea, Minn., has issued a 25-page catalogue of its road building machinery, describing the various pieces of equipment in detail and illustrating them on folded insert sheets using three colors. The equipment includes seven sizes of road graders, Fordson maintainers, rotary snow plows, Fresno scrapers, slip scrapers, road drags, wheel scrapers, road plows, road rooters, culverts, intake grates for tile, and hog land levelers.

The graders go by the names "Pioneer" (for very heavy work), "Chief," "Light Standard," "Comet," "Junior," "Patrol Special," and "Service Patrol."

The company offers to ship any of its products freight prepaid for a fifteen-day free trial, which has been its sales policy since 1878.

NEWS OF THE SOCIETIES

Aug. 17-20—INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS. Annual convention at Hotel Statler, Detroit, Mich.

Sept. 1-2—LEAGUE OF PENNSYLVANIA CITIES OF THE THIRD CLASS. Twenty-sixth annual convention at Sanbury, Penna.

Sept. 7-12—NEW ENGLAND WATER WORKS ASSOCIATION.. Annual convention on board steamer on St. Lawrence River.

Oct. 3-13—PAN-AMERICAN ROAD CONGRESS. To be held at Buenos Aires, Argentina.

Oct. 12-13—SOUTHWEST WATER WORKS ASSOCIATION. Convention at Tulsa, Okla.

Oct. 14-16—AMERICAN SOCIETY OF CIVIL ENGINEERS. Fall meeting at Montreal, Quebec.

Oct. 15-17—CALIFORNIA SECTION AMERICAN WATERWORKS ASSOCIATION. Sixth annual convention at Santa Cruz.

Oct. 19-22 — AMERICAN PUBLIC HEALTH ASSOCIATION. Annual convention at St. Louis, Mo.

Oct. 26-29—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention at Des Moines, Iowa.

Nov. 17-19—INTERNATIONAL CITY MANAGERS' ASSOCIATION. Annual convention at Grand Rapids, Mich.

Nov. 18-20—ASSOCIATION OF STATE HIGHWAY OFFICIALS. Annual meeting at Detroit, Mich.

Jan. 11-15, 1925—AMERICAN ROAD BUILDERS' ASSOCIATION. Annual convention and Road Show at Chicago.

NEW ENGLAND WATER WORKS ASSOCIATION

A preliminary program of the convention of this society, to be held September 8 to 11 on board a steamer on the St. Lawrence and Saguenay rivers, has been prepared as follows:

TUESDAY, SEPTEMBER 8, 1925
Evening Session, 8 O'clock

1. "Improvement of the Water Supply of Keene, N. H." R. S. Weston, Consulting Engineer, Boston, Mass.

2. "The Lawrence Water Supply, Investigation and Construction." Morris Knowles, and Myron G. Mansfield, Consulting Engineers, Pittsburgh, Pa., and Patrick Nugent, Supt. of Water Works, Lawrence, Mass. Illustrated by lantern slides.

WEDNESDAY, SEPTEMBER 9, 1925
Morning Session, 9 O'clock

1. "Tastes in the Water Supply of Marquette, Michigan, Due to Phenol Wastes." Paul Hansen, Consulting Engineer, Chicago, Ill.

2. "Iodine in Massachuetts Waters." Harry W. Clark, Director and Chief Chemist, Mass. Dept. of Public Health.

3. "Fineness Modulus for Filtration Sands." R. G. Tyler, Assoc. Prof., Sanitary Engineering, Mass. Inst. of Technology.

Evening Session, 8 O'clock

1. "The New Sebago Lake Intake of the Portland Water District." Leonard Metcalf, Consulting Engineer, Boston, Mass., and Harry U. Fuller, Engineer Portland Water District. Illustrated by lantern slides.

2. "The New Little Quittacas Intake at New Bedford, Mass." F. A. Barbour, Consulting Engineer, Boston, Mass. Illustrated by lantern slides.

THURSDAY, SEPTEMBER 10, 1925
Morning Session, 9 O'clock

1. "The Design of Water Filters." James W. Armstrong, Filtration Engineer, Water Dept., Baltimore, Md.

2. "Scoring of Water Supplies for Grading." E. Sherman Chase of Metcalf & Eddy's Staff.

Afternoon Session, 2 O'clock

1. "The Water Works of Quebec City." J. A. Tremblay, Chief Engineer, Water Works Dept., Quebec City.

2. "The Substitution of Machinery for Hand Labor in Pipe Laying." Stephen H. Taylor, Supt. Water Dept., New Bedford, Mass.

Evening Session, 8 O'clock

1. "The Coolgardie Pipe Line in Australia and Measures Taken to Correct Corrosion." Col. Francis F. Longely. Illustrated by lantern slides.

2. "The Improved Water Works System of Wheeling, West Virginia." J. F. Laboon (The J. N. Chester, Engrs.), Consulting Engineer, Pittsburgh, Pa. Illustrated by lantern slides.

FRIDAY, SEPTEMBER 11, 1925
Evening Session, 8 O'clock

1. "Financing Main Pipe Extension by Assessment Method." Caleb M. Saville, Mgr. and Chief Engineer, Board of Water Commissioners, Hartford, Conn.

2. "The Filtration Works of the City of Montreal." Frederick E. Field, Filtration Engineer, Montreal Water Board.

The following topics of interest to superintendents will be opened for discussion—if time permits—at one or more of the sessions:

1. "Upkeep of Reservoirs, Pumping Stations and Grounds Connected Therewith."

2. "Periodical Inspection of Gates, Hydrants, Air Valves and Other Equipment."

3. "Economical Width and Depth of Water Pipe Trenches."

4. "Continuous Reading of Meters and Billing Throughout the Year."

5. "Testing Large Meters Periodically."

6. "Life of a Small Service Meter."

7. "What Type of Hand Shovel is Most Economical for Trench Work?"

ENTERTAINMENT

By courtesy of the Water Works Manufacturers' Association there will be an informal Reception and Dance at the Thousand Islands on Monday night, September 7th.

The sailing schedule allows for several hours stop every day thus allowing the members to go ashore and inspect points of interest, also ample opportunity for golf.

The regular orchestra and cabaret singers attached to the S. S. Richelieu will accompany the party and will provide music for dancing and entertainment on board the boat.

There will be no exhibit of water works appliances and supplies.

The nominees for officers for the year 1925-1926 have been announced as follows: president, Theodore L. Bristol, Ansonia, Conn.; vice-president, Geo. A. Carpenter, Pawtucket, R. I.; treasurer, Albert L. Sawyer of Haverhill, Mass.

COLORADO SECTION, THE AMERICAN SOCIETY OF CIVIL ENGINEERS

This Section has elected as its officers for the coming year, Lyman E. Bishop as president, Fred R. Dungan as vice president, and C. A. Betts as secretary-treasurer.

BALTIMORE SECTION, AMERICAN SOCIETY OF CIVIL ENGINEERS

This section has elected for the coming year as president, Herman P. Doeleman; as vice president, Ralph F. Proctor, and as secretary-treasurer, C. E. Keefer.

NORTH CAROLINA SECTION, A. S. C. E.

The North Carolina section of the American Society of Civil Engineers met in Asheville on August 11th. A paper was read by A. N. Johnson, chairman of the Highway Research Board, on the subject of "Highway Research," in which he summarized the status of highway research in the United States. The Highway Research Board has compiled a list of highway research projects totaling 479, of which 205 are state highway investigations, 184 are university investigations, and 90 are municipal, county and industrial. Research conducted by the United States Bureau of Public Roads and other agencies has resulted in the more economical design of roads and has pointed the way to better methods of construction.

AMERICAN SOCIETY CIVIL ENGINEERS

The summer meeting of this society was held at Salt Lake City July 8th to 10th with an attendance of about 220 members and guests. Irrigation was the subject receiving by far the greatest amount of attention from the convention. Reclamation was discussed by A. P. Davis, R. E. Shepherd and John E. Field, and other phases of the subject were discussed by a number of engineers, chiefly from the western states.

In addition to irrigation, the highway division discussed the finishing and curing of concrete roads and snow removal problems on state highways, papers on the latter subject being read by representatives of the state departments of Utah, Wyoming and Colorado.

The City Planning Division at its session discussed the development of industrial sites and trackage layouts, Walter R. Armstrong, general superintendent of the Los Angeles and Salt Lake R. R., opening the discussion with a paper on the subject.

AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS

Committees on program and convention arrangements are making every effort for a record-breaking meeting at Des Moines on October 26th to 29th. President Dalton has sent out an appeal to the members to double the membership (the present membership being only about 700), calling attention to the fact that the American Concrete Institute has 1,500, American Society for Testing Materials 3,700, and the Municipal Engineers of the City of New York alone has 450 members.

Arrangements are already being made for transportation to the convention. The C. R. I. & P. R. R. has made arrangements for a special train from Chicago, leaving that city on Sunday at 11:00 P. M. and reaching Des Moines at 7:59 the next morning. Arrangements were made in cooperation with John B. Hittell, representing the society. It is possible that special trains will be arranged from other points by this railroad. Information in connection therewith may be obtained by addressing any of the company's offices at Atlanta, Memphis, Philadelphia, Pittsburgh, Boston, Buffalo, Cleveland, Dallas, and so forth.

AMERICAN ROAD BUILDERS ASSOCIATION

In connection with its convention next January, the Association is planning to inaugurate a "Good Roads Week" to be observed throughout the country, the week of January 11th having been selected. It is hoped that exercises will be held in the public schools and that civic clubs will hold special meetings at the time that the Association is holding its annual convention in Chicago.

INTERNATIONAL ASSOCIATION OF FIRE ENGINEERS

The fifty-third annual convention of this association will be held at Louisville, Ky., September 29th to October 2nd. The state armory has been reserved for an exhibit of fire apparatus and appliances. Among the papers to be read are one on "Fire Protection in Smaller Towns" by Chief H. E. Whitener of Hickory, N. C., and "Cooperation of Fire and Water Departments," a report by the joint committee of the International Association of Fire Engineers, National Fire Protection Association and American Waterworks Association.

ASPHALT PAVING CONFERENCE

The fourth annual Asphalt Paving Conference will be held at Detroit on October 21st to 24th under the auspices of the Asphalt Association. This conference will devote considerable attention to surface treatment for roads so as to adapt the cheaper types of pavements, such as sand-clay, gravel and macadam, to sustain traffic without a large initial outlay of highway funds.

ASSOCIATED GENERAL CONTRACTORS

Nominations are now being made for vice-president and directors of the Associated General Contractors to fill vacancies arising at the end of this year. These will consist of a vice-president from Zone 4, and directors from Districts 1, 2, 3, 10, 12, 14 and 15.

MISSISSIPPI RIVER FLOOD CONTROL ASSOCIATION

This association, has elected as its officers, W. H. Dick of Memphis as president; H. D. Tomlinson of Butler, Ark., as vice-president; and Fred D. Beneke of Memphis as secretary.

PERSONALS

Davis, Eugene E., superintendent of the department of water purification, pumping and storage of Richmond, Va., died July 20, aged 74 years. Probably no member of the American Water Works Association except the late John Diven was more faithful in attending the technical meetings of that society and more widely known to its members. He had been in the service of the city for fifty-five years. His father had founded the city's water works in 1863.

Van Duzer, William A., has been appointed chief deputy engineering executive of the Pennsylvania State Highway Department.

Taylor, I. E., formerly county engineer of Pottawatomie and Mitchell counties, Kansas, has been appointed division engineer by the State Highway Commission of that state, with headquarters at Beloit.

Felps, C. I., up to two years ago assistant state highway engineer of Kansas, has been appointed engineer of construction for the Kansas State Highway Commission.

Barnes, H. D., formerly county engineer of Butler County, Kansas, has been appointed division engineer of the Southeastern Division of the State Highway Commission.

Stahl, C. E., formerly with the Missouri State Highway Commission, has been appointed division engineer by the Kansas State Highway Commission, with headquarters at Norton.

Roby, J. A., formerly resident engineer on Kansas highway work, has been appointed division engineer by the Kansas State Highway Commission, with headquarters at Garden City.

Gladding, Henry H., for 42 years in the employe of the city of New Haven, Conn., as engineer, has retired from service.

Officials of the newly created Baltimore Department of Public Works have been appointed by Mayor Howard W. Jackson as follows:

Crozier, Bernard L., for two years highway engineer, as chief engineer of the department; also as a member of the Baltimore Traffic Survey Commission.

Purcell Steuart, formerly chief engineer of the city, as head of the Bureau of Highways.

Siems, V. Bernard, formerly water engineer and president of the Water Board, as head of the Bureau of Water Supply.

Ruark, Milton J., formerly head of the sewer division, as head of the Bureau of Sewers.

McKinney, Francis W., formerly engineer for the Commissioners for Opening Streets, as head of the Bureau of Harbors.

Goob, Charles F., formerly head of the electrical division, as head of the Bureau of Mechanical-Electrical Service.

Osborne, Charles H., formerly inspector of buildings, as head of the Bureau of Buildings.

Shirley, Joseph W., formerly chief engineer of the Topographical Survey, as head of the Bureau of Plans and Surveys.

Zieget, Conrad, Jr., formerly chief of the municipal laboratory, as head of the Bureau of Standards.

Lackey, Oscar F., as head of the Bureau of Transportation.

Larkins, William A., formerly commissioner of street cleaning, as head of the Bureau of Street Cleaning.

U. S. CIVIL SERVICE EXAMINATIONS

Junior Mathematician. Applications received until Sept. 12. To fill vacancies in the Langley Memorial Aeronautical Laboratory under the National Advisory Committee for Aeronautics, in positions of laboratory assistant qualified as computer and plotter. Entrance salaries $1860 to $2400, depending upon qualifications. Duties, to compute research experimental data and observations resulting from tests of aircraft; compute tables of reference, and characteristics of measuring elements of special aeronautical instruments; make graphs of above data and analyze them with aid of integraph, integrator, planimeter, etc.; make drawings and construct graphic models.

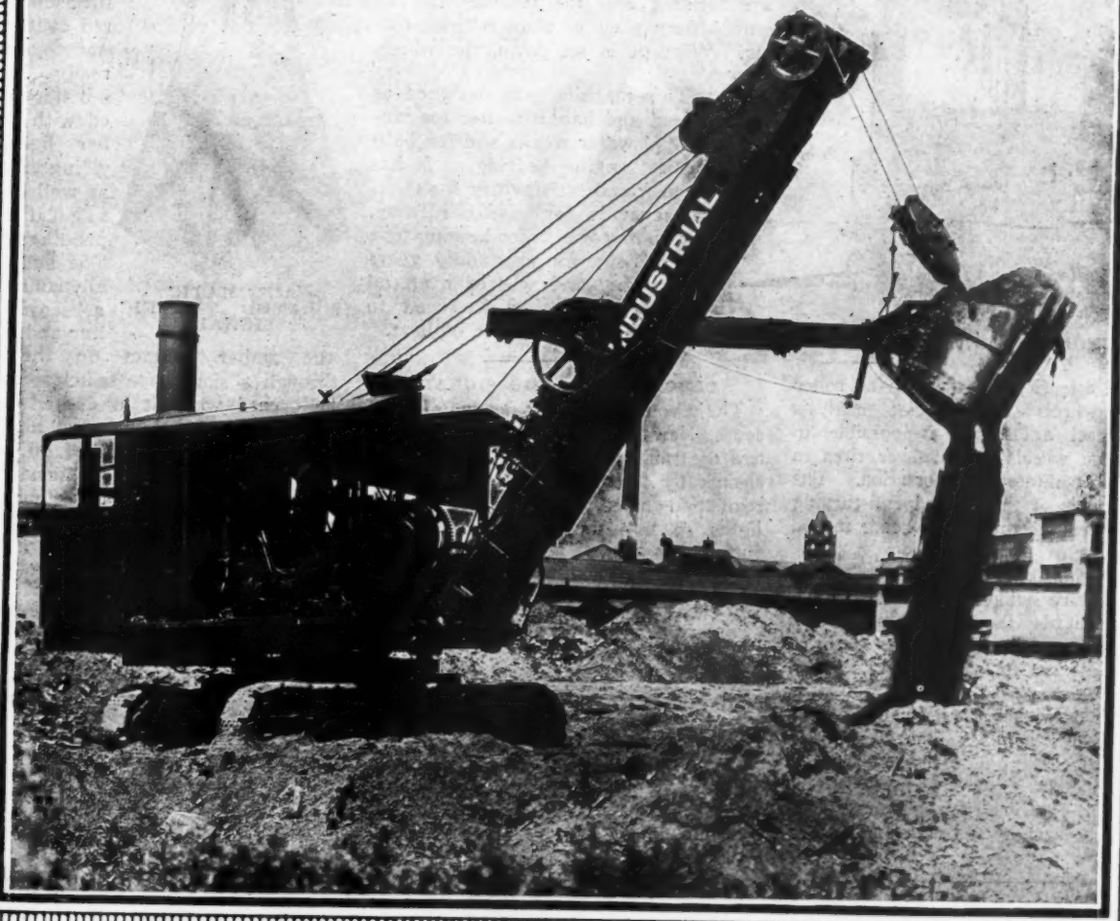
Second Class Steam-Electric Engineman. Applications received until Sept. 21. Entrance salary $1,320 with possible advance without change in assignment to $1,680. Duties require intimate knowledge of construction, operation and repair of boilers, engines, turbines, condensers, pumps and other power plant auxiliaries of motors and generators for both A. C. and D. C.; also heating plants, elevators and electrical distribution systems.

Under Laboratory Mechanic. Applications received until Sept. 22. Entrance salary $1,140 with possible advance to $1,500. To fill a vacancy in the Division of Mechanical Technology, National Museum, Washington, D. C. Duties, to assist in the installation of exhibit material and in the construction of models, and to assist in the preparation of exhibition material from furnished specifications.

Junior Metallurgist. Applications received until Sept. 26. To fill a vacancy at Frankford Arsenal, Philadelphia, Pa. Entrance salary, $1,920 to $2,040, with possible advance to $2,400. The duties consist of general metallurgical work including process control, physical testing of non-ferrous metals, microphotography, and research on a large variety of metallurgical problems.

At last!

The Perfect Crane-Shovel



INDUSTRIAL

CRAWLING TRACTOR CRANES

INDUSTRIAL WORKS · · · BAY CITY · MICHIGAN

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

PORTABLE PAVING ASPHALT KETTLE

Littleford Bros., Cincinnati, Ohio, who for many years have specialized in the manufacture of portable asphalt melting kettles, have recently announced the new improved Asphalt Heater No. 48 which is made especially for paving work. In creating this design a great deal of attention was given to securing the maximum heating efficiency and in comparative tests. heated material was delivered in one-half to one-third of the time usually required.

LITTLEFORD ASPHALT HEATER NO. 48

Special attention is called to the roller bearing wheels and special analysis carbon steel axles. It is possible to equip these wheels with rubber tires in order to facilitate transportation. The fifth wheel is of the pivoted full-turning type and permits the heater being turned in a radius of eight feet.

The special "convenience cover" is an added feature which simplifies loading and safeguards the kettle men from dangerous splashing and serious burns.

Facilities are provided for hoisting barrels or drums to the top of the kettle when it is desired to use a warming hood.

This heater is made in sizes ranging from 300 to 1500 gallons capacity, which are completely described in a special Bulletin B-1 which has been prepared and will be sent by the manufacturer on request.

PORTABLE LEAD MELTING FURNACE

The Chausse Oil Burner Company, of Elkhart, Ind., has recently produced a portable furnace for use in melting lead, babbit, cyanide and other similar substances, which is a combination of a Chausse oil burning torch equipment with a retort, mounted on a framework with wheels. It weighs about 160 pounds empty, and its width is 20 in., length 36 in., and height 33 in. The heating chamber is 14 in x 14 in x 16 in. high, and is lined with fire brick with the flame entrance from the bottom. The kerosene tank holds 12 gallons, which is sufficient for 12 hours' operation at maximum temperature. The burners, consuming one gallon per hour, will deliver sufficient heat to melt two hundred pounds of lead in from 20 to 30 minutes from a cold start. The maximum temperature generated by the burners is eighteen hundred degrees. Pressure on the tank is maintained between 10 and 20 pounds by one Chausse hand pump.

An interesting feature of this machine is the movement of the wheels, so continued that when stationary the forge sits horizontal on its base. By lifting on the handles at the rear (the side opposite the wheels), the wheels are lowered and the machine can be moved from place to place without tilting. When it is set down, the wheels rise.

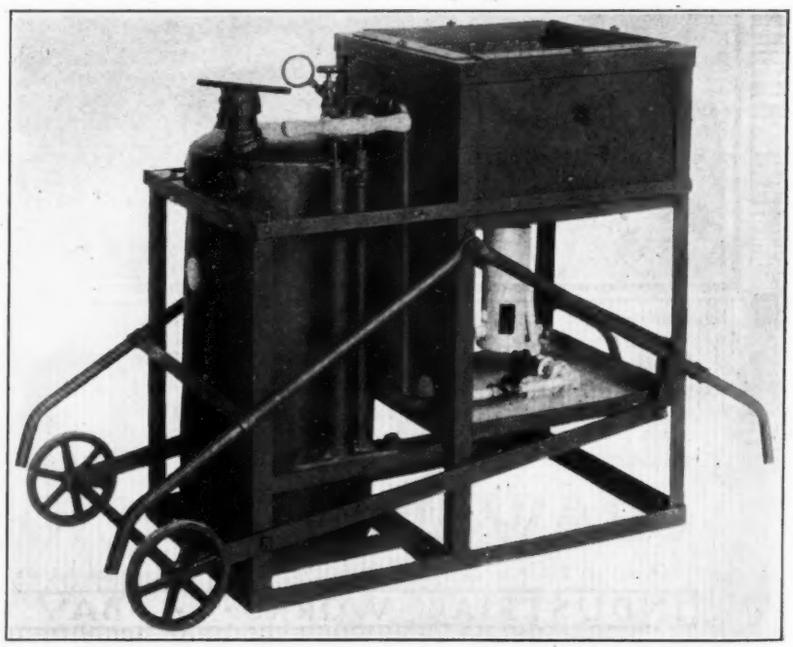
This machine was designed as a lead and babbit melter for municipal water works and for babbitting engine bearings. It has been found satisfactory for melting cyanide for case hardening, for boiling water, for heating pipe to be bent, for expanding gears or collars, and wherever an oil burning forge can be used to produce a high degree of heat.

ELECTRIC TRAFFIC SIGNALS

The Crouse-Hinds Company, of Syracuse, New York, has developed a system of traffic control which provides an electrically interlocked system of traffic regulation based on displaying colored lights so that they are clearly visible during day as well as at night. Red is used for stop and green for go, but when it is desired to change the direction of traffic the caution light, amber in color, is displayed for two seconds. The switch which controls the signals is so designed that the contact arm overlaps the green and amber contacts and the amber and red contacts. In many systems already installed, a bell is connected with the amber light, providing an audible as well as visual signal of impending change. The bell is usually connected to a separate bus line and wired to the amber contact on the switch through a single-pole switch, which may be opened when it is desired to leave the amber lights burning at night after the traffic system is turned off.

AUTOMATIC ISOLATED TRAFFIC SIGNAL

When it is desired to handle traffic along parallel and intersecting streets, only four wires are required for the control, one being a common negative for all the signal lamps while the other three



CHAUSSE PORTABLE BABBIT OR LEAD MELTING FURNACE.

Cure Concrete Without Water
One Man Does It All Alone

The application of Dowflake to the surface of newly laid pavement is a simple one-man job, yet it does all the curing and takes the place of moist earth or straw, ponding, water pumping and all the fuss and muss of old-fashioned curing methods.

After being applied Dowflake automatically keeps the surface wet without needing any additional labor and without leaving anything to be scraped or hauled away.

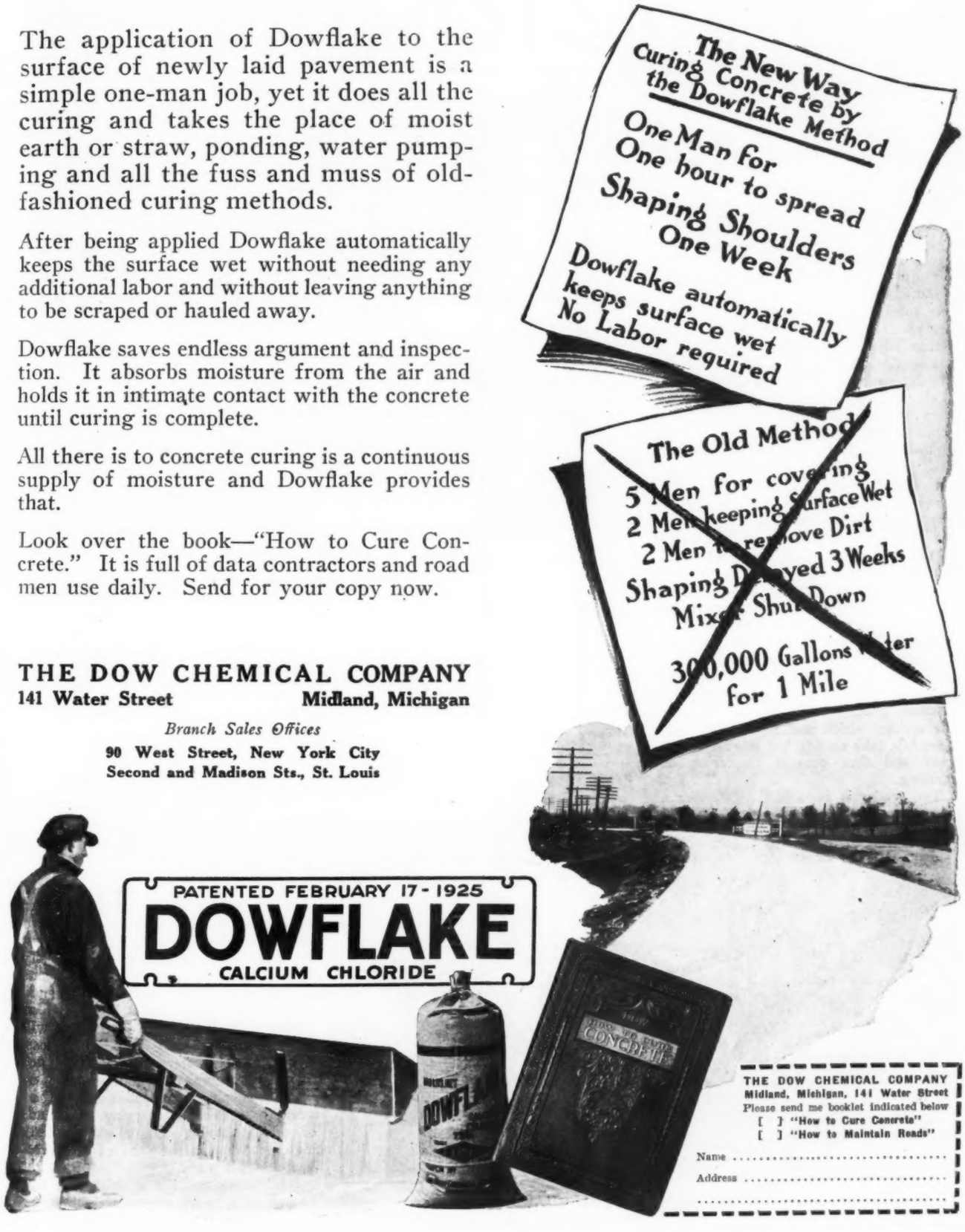
Dowflake saves endless argument and inspection. It absorbs moisture from the air and holds it in intimate contact with the concrete until curing is complete.

All there is to concrete curing is a continuous supply of moisture and Dowflake provides that.

Look over the book—"How to Cure Concrete." It is full of data contractors and road men use daily. Send for your copy now.

THE DOW CHEMICAL COMPANY
141 Water Street **Midland, Michigan**

Branch Sales Offices
90 West Street, New York City
Second and Madison Sts., St. Louis



THE DOW CHEMICAL COMPANY
Midland, Michigan, 141 Water Street
Please send me booklet indicated below
[ ] "How to Cure Concrete"
[ ] "How to Maintain Roads"

Name .....

Address .....

.....

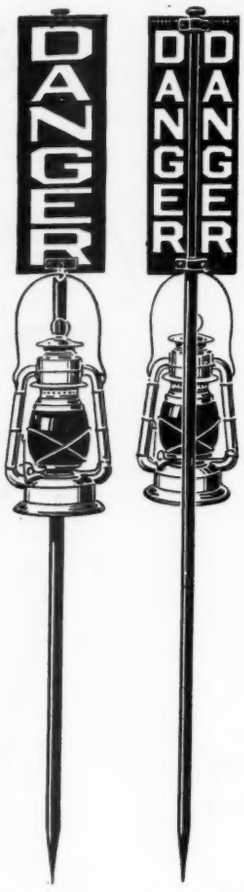
are positive. The three positive wires are connected to the three segments of the master control switch, to the moving arm of which is connected the main positive. When several parallel streets are controlled the bus wires for all streets should be connected in multiple to the switchboard located at the main control station; then any individual street may be disconnected from the system and controlled independently in case of an emergency.

The company has developed a number of types of traffic signal units, details of wiring and so forth, which are used in various combinations to meet the requirements of any given city or district, each of which must generally be studied individually and a system adapted to it.

ADAMS INTERNATIONAL GRADER

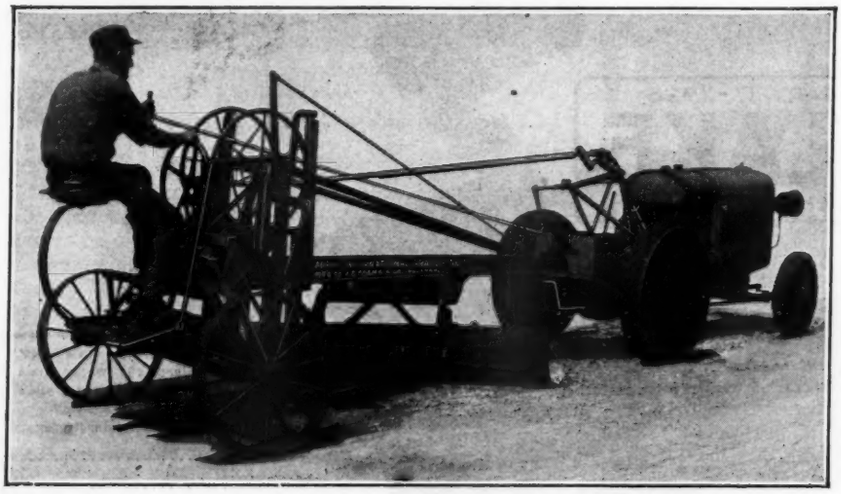
J. D. Adams & Co., of Indianapolis, Ind., announces an International Grader which has just been placed on the market for use with any McCormick-Deering 10-20 tractor to form a one-man motorized road patrol outfit. The advantages claimed for this grader are that it has adjustable leaning wheels which enable the operator to lean the weight of the grader toward and balance it against the side load on the blade to keep the machine from skidding away from its work; that it can readily be disconnected from the tractor at any time and the latter used for hauling, plowing, etc.; that the steering, which is easily done with one hand, is not affected by the side load against the blade as is the case with machines having tractors in the rear; that all of the grader and tractor controls are in front of the operator and his view of the blade and its work is not obstructed in any way; and that it cuts more steadily and smoothly than any other grader because, in addition to having sufficient wheel base and rigid construction, it has the adjustable leaning wheel which holds the machine steadily to its work, and blade lift springs which pull up on the blade assembly, take up any lost motion due to wear and thus prevent chattering or jumping.

The grader is furnished with either a seven foot or ten foot blade, as desired, while an extension of 1½ feet net can be added to either or both ends. The wheel base is 12 ft. 3 in.; the wheels 30 in. in diameter with 4 in. tires and a wheel tread of 5 ft. 1 in. The weight with the seven-foot blade is approximately 1535 pounds and with the ten-foot blade 1655 pounds. The McCormick-Deering farm tractor travels about four miles an hour in high gear and the industrial type four miles an hour in second gear.

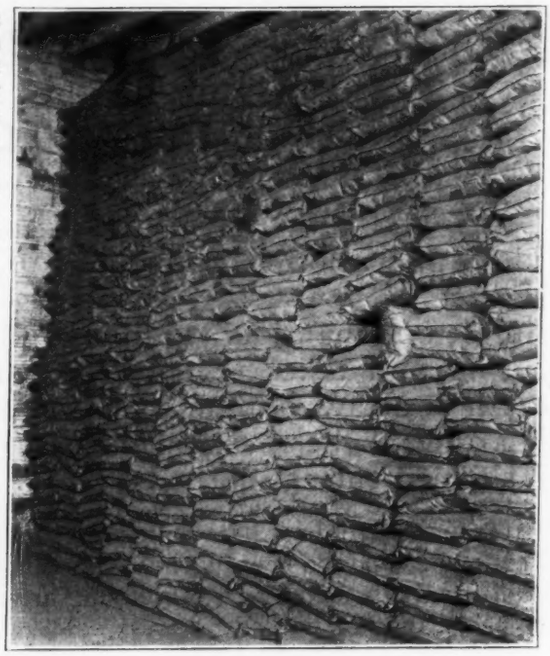


Front View Back View

STREET DANGER SIGNS



ADAMS INTERNATIONAL GRADER



MULTI-WALL BAGS STACKED IN THE MOELLERING SUPPLY CO.'S WAREHOUSE IN FT. WAYNE.

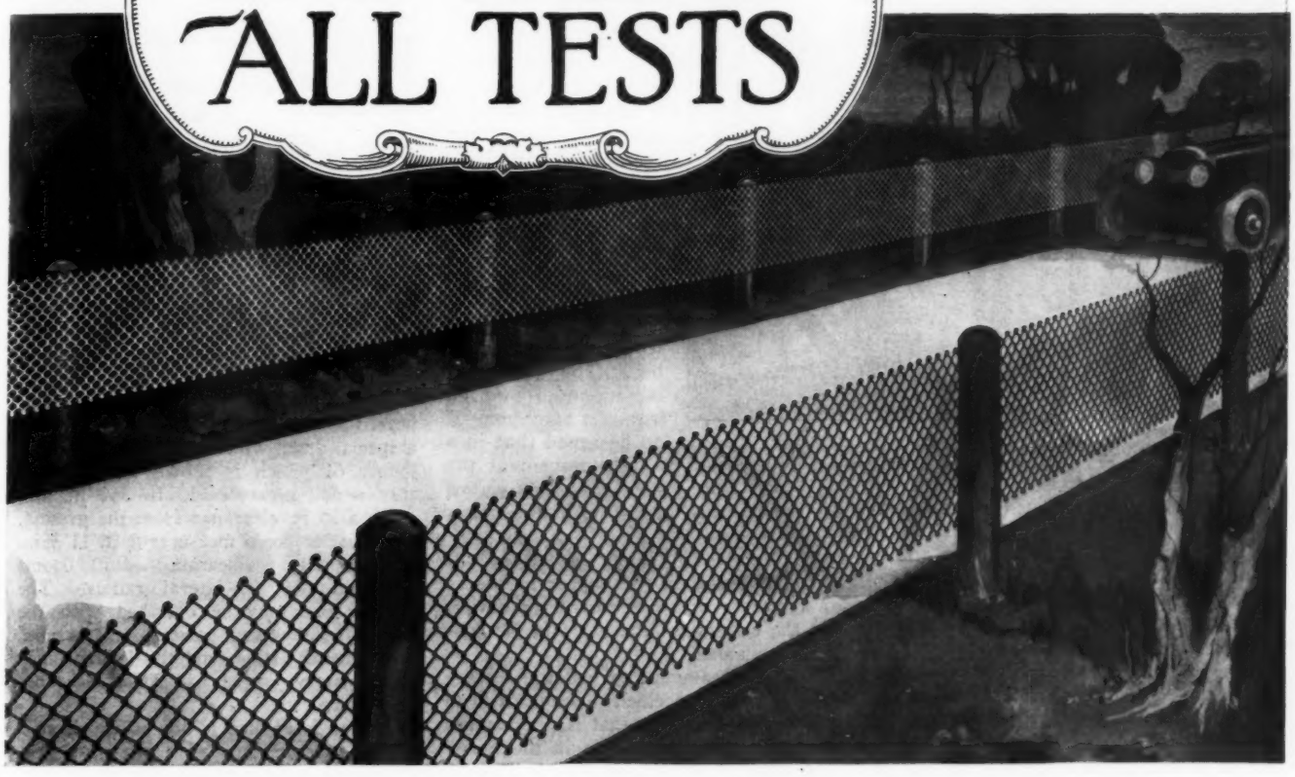
STREET DANGER SIGNS

Joseph G. Pollard Company, Inc., of 146 Raymond Street, Brooklyn, New York, has just placed on the market a new style of street danger sign. The sign is made of twenty gauge metal, 6¾" wide and 19" high, carrying white letters on a red background. This plate is supported by a rod of ⅝" steel 6 feet long, with a flat head on top that permits it to be driven into hard ground. At the bottom of the plate is a hook on which a lantern can be hung.

BATES MULTI-WALL BAG

The Bates Valve Bag Company, of Chicago, manufactures a paper bag as a container for cement, plaster and gypsum which is claimed to give ideal protection against rough handling and moisture. It is made of four or five plies of tough, pliable paper which are sewed together at the top and bottom with a bound sewed seam designed to prevent the contents from sifting. This really makes each wall a separate bag and acts as four or five paper bags in one. Should all but one of the walls be broken or snagged on a nail, the remaining one will still carry the contents without any loss. The bags are waterproof and need not be covered with tarpaulins in case of rain. The photograph shows a test of strength, bags each carrying 94 pounds of cement having been piled up thirty high, reaching to the roof of the warehouse. This made over a ton of weight in each stack and not a single bag was broken as a result of the weight.

HAS STOOD ALL TESTS



Cyclone Road-Guard has made good. Today it is recognized as one of the greatest developments in years for roadway safety.

This better highway guard never has been broken through. It catches cars and holds them safely. Saves lives and dollars. The economical guard for dangerous curves, steep embankments, bridge approaches, highway terminals, etc.

Use these specifications to order Cyclone Road-Guard:

ENGINEERS' SPECIFICATIONS

End posts to be 6" to 8" round or square Y.P. or cedar.

Line posts to be 6" to 7" round or square Y.P. or cedar.

End posts to set 3' 6" in ground.

Line posts to set 3' 0" in ground.

All posts to extend 3' 6" above grade.

Each end post to be braced by a 4" x 4" Y.P. brace extending from top of end post to grade line of first line post.

Brace to be mortised into end post and line post.

All posts to be spaced not more than 10' 0" C. to C.

Where heavy service is required posts to be spaced 8' 0" to 10' 0" C. to C.

Fabric 24" high; fastened to posts 12" above grade line.

Fabric to be of No. 6 gauge heavy steel wire, 2" mesh chain link type; knuckled top and bottom, galvanized after being woven. The links shall be formed by gradual easy bending, so as to preserve all of the natural strength and elasticity of the material, avoid all sharp wraps or kinks.

Fabric shall show no rust spots or abrasion of coating and shall be delivered on job before any painting is done so it can be thoroughly inspected.

At end posts fabric shall be fastened to 3 sides with 5 staples each.

At line posts fabric shall be fastened with 5 staples.

Staples to be made of No. 7 wire 2" long.

We will be glad to send you any further detailed information you may want about Cyclone Road-Guard and how it provides far greater protection at lower maintenance cost.

Phone, wire or write for name of your distributor.

CYCLONE FENCE COMPANY

Factories and Offices:

Waukegan, Ill. Cleveland, Ohio
Newark, N. J. Fort Worth, Texas

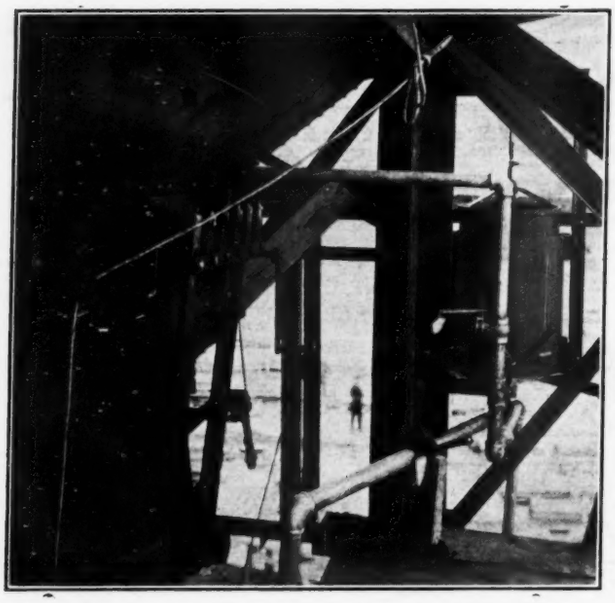
Pacific Coast Distributors:

Standard Fence Co., Oakland, Calif.
Northwest Fence & Wire Works, Portland, Ore.

The Mark of Quality

Cyclone ROAD-GUARD

FOR SAFER HIGHWAYS



BLAW-KNOX "INUNDATOR" (AT THE RIGHT) USED ON CONSTRUCTION OF THE PITTSBURGH STADIUM.

ACCELERATING CEMENT HARDENING

The Security Cement & Lime Company, of Hagerstown, Md., manufactures a material for accelerating the hardening of portland cement mixtures which it calls "Cal."

The U. S. Bureau of Standards states that the use of commercial calcium chloride in concrete is attended by difficulties caused by its highly hygroscopic property and by the handling of the solution, and "Cal" is a material by which the above difficulties are eliminated. It has the additional advantage that the products of its decomposition by water are calcium chloride and calcium hydroxide which are equivalent in effect to a simultaneous addition of calcium chloride and finely divided hydrated lime. The official report of a test by the Bureau of Standards states that by the use of "Cal" the setting of portland cement mixtures may be hastened and the workability of the mixtures increased. Unsound cements may be made sound and quick setting cements be made normal.

"Cal" is furnished as a dry, white powder which is added dry to the cement and aggregates. It is claimed that it cures, fattens, hardens, densifies, waterproofs, accelerates and frost proofs all portland cement mixtures. It is recommended for constructing highway paving to hasten the setting, for sidewalks to reduce hair checks and cracking, and for patching new concrete onto old.

BLAW-KNOX INUNDATOR

The Blaw-Knox Company, of Pittsburgh, Pa., describes its "Inundator" as "A machine which compensates for the bulking action of moisture in sand; also provides for the introduction of the correct amount of water into the concrete batch, thereby giving assurance of a constant concrete having uniform strength." It is based on the principle that when sand, regardless of the degree of dampness which it contains, is submerged or inundated, the bulking effect due to such dampness ceases and the sand settles to uniform compactness in the water.

The apparatus consists of an inundator or self-dumping and righting steel container with an adjustable bottom, a shaker or sand sifter, a strike-off gate, and an excess water measuring tank and water storage chamber. The inundator is mounted on a trunnion arrangement so designed that in a single movement the sand and the water for the mix are deposited in the mixer hopper.

The specified batch of stone or gravel is placed in the hopper by means of a batcher or other measuring device, and the cement is introduced in the customary manner.

The exact amount of water necessary to inundate a specified amount of sand is a known quantity; that is, the amount necessary to fill the voids in the measured sand which is insufficient for the batch itself. The excess water tank is therefore used to measure, for each batch, sufficient additional water to complete the batch. The two variable elements are thus adjusted to a nicety—one an exact measure of sand, the other exactly the right quantity of water; both as specified by the engineer to secure the best possible concrete for that particular job.

The inundator is furnished for operation with a Blaw-Knox "batcher-plant," or for separate installation in connection with the contractor's own ideas. Any Blaw-Knox "batcher plant" equipped with batchers for measuring sand and stone can be adapted to receive the inundator in place of the sand batcher by making simple alterations to the bin bottom.

MACK TRUCK CRANE

The International Motor Company of New York City has developed a crane mounted on Mack trucks of 1½, 2 and 2½ tons capacity which was designed primarily for the purpose of unloading 1000-gallon fuel oil tanks from gondola cars, but is adaptable to handling gasoline drums, barrels and other objects weighing up to 2,500 pounds.

The equipment consists of a mast, braced and anchored to the chassis frame, a special drum-winch and two booms, the longer of which is shown in the illustration and measures 13 ft. 3½ in. and gives a 16 ft. clearance from the ground. The shorter boom measures 8 ft. 11 ½in. and has a 10 ft. clearance. Both booms have an 8½ ft. lateral radius. The shorter one may be operated with the mast in a lowered position and is used for general lifting, and the longer boom is necessary where additional clearance is required.

Power is applied to the winch from a power take-off through a one-speed forward and reverse gear and a chain drive to the winch worm sprocket. The controls are located directly behind the cab. Attached to the rear of the cab is an auxiliary gas control which permits the operator to regulate the engine speed without leaving his position at the control levers. To insure rigidity of the chassis while the crane is being operated,

MACK TRUCK CRANE HOISTING 1,500-LB. FUEL OIL TANK.

Good Roads *Kept* Good - with Stanolind Paving Asphalt and Stanolind Asphalt Road Oils

Road improvement work may be carried on at low cost and with excellent results when Stanolind Paving Asphalt and Standard Asphalt Road Oils of correct grade are used.

For Improving Dirt and Stone Roads

Standard Asphalt Road Oil of the right grade to meet local conditions will protect and build up ordinary dirt and stone roads. Repeated applications throughout four or five years will provide a base for the higher types of asphalt pavements.

For Seal Coats on Oil Roads

Dirt and stone roads which have been treated with Standard Asphalt Road Oil for a period of four or five years may be converted into paved highways by the application of a seal coat of Stanolind Paving Asphalt of the right grade. This will give a wearing course which will last for several years, at a very low cost of upkeep.

For Resurfacing Brick Pavements

Rough and badly worn brick pavements may be put into good condition—economically—by resurfacing with Stanolind Paving Asphalt. The application of the proper grade of asphalt, at comparatively low cost, will put the pavement in shape for many more years of service.

For Resurfacing Concrete Roads

Where concrete roads have started to crack or to show signs of surface disintegration, resurfacing with Stanolind Paving Asphalt will halt the destruction and make a road which will stand up under all kinds of traffic.

HEAVY summer traffic inflicts grueling punishment on every type of improved road. If roads are to be kept in good condition, maintenance and repairs must be regular and systematic.

Attention to small ruts and holes may be given at small cost NOW—and will save expensive operations required later if the road is neglected.

Special grades of Stanolind Asphalt and Standard Asphalt Road Oils are made for use in every kind of repair and maintenance work. Twenty-seven branches provide excellent facilities for quick service, and also for expert advice on your particular repair and maintenance problems.

Without cost to you, a Standard Road Engineer will be glad to advise you on your repair and maintenance work. Write or telephone our nearest branch.

STANDARD OIL COMPANY

(INDIANA)

General Offices: 910 S. Michigan Avenue CHICAGO, ILLINOIS

ILLINOIS	INDIANA	IOWA	S. DAKOTA	N. DAKOTA	MINNESOTA	MISSOURI
Chicago	Evansville	Davenport	Huron	Fargo	Duluth	Kansas City
Decatur	Indianapolis	Des Moines	MICHIGAN	Minot	Mankato	St. Joseph
Joliet	South Bend	Mason City	Detroit	WISCONSIN	Minneapolis	St. Louis
Peoria	KANSAS	Sioux City	Grand Rapids	La Crosse		
Quincy	Wichita		Saginaw	Milwaukee		

two jack screws support the mast from the ground. These screws are attached to the cross members under the mast by a swivel so that when not in use the free ends may be fastened to brackets on the sides of the frame. The entire assembly can be mounted on any standard Mack truck with but little alteration to the body and none to the cab.

PORTABLE ACETYLENE GENERATOR

A small generator for producing acetylene at low pressure for welding and cutting has recently been developed by the Oxweld Acetylene Company, New York City. The new generator, which takes 35 lbs. of carbide at one charge, can be transported readily from place to place, thus providing a portable supply of generated acetylene gas. Empty, the generator weighs only 210 lbs.

An entirely new principle of feed control is used which might be called a "heavier-than-water" float. A vertical partition, extending nearly to the bottom into a water seal, divides the generator shell. One side is gas tight and contains the carbide hopper at the top. The upper part of the other side contains gas regulating and protective devices, and an automatic carbide feed control. Generation of the first acetylene causes water to rise on this side of the partition high enough to all but submerge a pan full of water, hung to a control lever. This pan normally acts as a weight acting counter to a spring, but as the water rises about it, its apparent weight is diminished and the carbide hopper valve is closed by the action of the spring. As acetylene is drawn off, water rises in the gas compartment and correspondingly lowers under the float, relieves some of the buoyancy under the water pan, which, gathering weight with the receding water, depresses the spring and allows a small amount of carbide to drop into the generator, and restores equilibrium conditions.

Because of its low center of gravity, the generator rights itself when tilted at an angle of 30°. It works perfectly at an inclination of upwards of 10°. No adverse effects result if a generator while in operation is knocked over. Nearly all fittings are enclosed in the cylindrical shell and there is little, if anything, projecting which may be injured by a fall on a concrete pavement.

This generator has been submitted to the Underwriters' Laboratories, Inc., and has been listed by them as an acceptable device for installation on insured premises.

INDUSTRIAL NOTES

SWEET'S INDUSTRIAL TRACK

Sweet Steel Company, of Williamsport, Pa., has recently shipped 26 car loads of industrial track, switches, etc., to the Macomb County (Michigan) Road Commission. The shipment includes track in 15 ft. sections, 24-in. gauge, 25 lb. rails, with seven No. 5 heavy duty ties per section. Both ends of each tie, which are of double corrugated type weighing 4½ lbs. per ft., are capped or closed to prevent sidewise skidding or creeping.

CUTLER-HAMMER PURCHASES PAYNE DEAN

The Cutler-Hammer Mfg. Co. has purchased the business and patents of Payne Dean Limited. The former has always manufactured the Dean valve control apparatus, and recently much of the other Payne Dean equipment, and will continue to do so. Mr. Dean and many of his associates are now connected with the Cutler-Hammer Co., and will actively assist in the promotion of this work.

BARBER-GREENE COMPANY

The Barber-Greene Company of Aurora, Ill., has placed three assistants with its district managers, H. H. Driver to assist J. A. Gurney in Pittsburgh; Frank S. Howard, Jr., to assist E. D. Cassel in Cleveland, and P. S. Frederick to assist C. B. Gould in Detroit.

B. E. Lindstrom is now in charge of the Chicago office, succeeding George R. Bascom, who died on June 26th. He will be assisted by Harold R. Haase.

PARADON AGENCIES

The Paradon Engineering Company, of Long Island City, N. Y., announces the appointment of F. H. Bradford to handle the sales and service of Paradon chlorinators in the states of Illinois, Michigan, Wisconsin and Indiana, with office at 111 West Washington Street, Chicago; of S. P. Rees to represent it in the south, with office in the Candler Building, Atlanta, Ga.; and of C. C. Behney for the states of Ohio, Kentucky, West Virginia and western Pennsylvania, with office in the Empire Building, Pittsburgh, Pa.

STOCKLAND COMPANY MANAGER

The Stockland Road Machine Co., announces the appointment on July 1 of Cal Sivright as general manager, with headquarters at Minneapolis. Vice-President J. D. Frazer retires from active management of this company to devote more attention to the management of the Lyle Culvert and Road Machinery Co., of which he is vice-president and general manager.

NEW CATALOGS

CHAUSSE OIL BURNER CO.

This company of Elkhart, Ind., has issued a new folder describing its self-heating smoothing iron, babbitt and lead meters, torches, surface heater, tool heater, etc. Four pages 8x11.

MONARCH TRACTORS INCORPORATED

Monarch Tractors, Incorporated, of Watertown, Wis., announces the appointment, as its vice-president and general manager, of R. W. Gotshall, formerly assistant manager of the Holt Mfg. Co.; and as vice-president and director of sales, of H. B. Baker, for 12 years past sales manager of the Holt Mfg. Co.

OSGOOD POWER SHOVEL

The Osgood Company of Marion, O., describes its power shovel in detail, with working ranges, dimensions, etc. 4 pages 8½x11.

FLORY GASOLINE HOISTS

The S. Flory Manufacturing Co., in its latest catalogue describe exclusively its gasoline hoists, from 5 to 60 H. P., in single, double, or three-drum units, with or without swinging gears. 8 pages 6x9.

STANDARDS IN PUMP INDUSTRY

The third edition of "Standards of the Hydraulic Society" was issued early in June by this association of pump manufacturers, giving standard nomenclature, sizes, dimensions, equipment, etc. as recommended by the society. 34 pages 6x9.

RECOMMENDED BUILDING CODE

The Portland Cement Association has issued, in a 60-page pamphlet, a revised edition of a "Recommended Building Code for Cities with Populations from 25,000 to 150,000," copies of which can be obtained from the association. This code was first presented by the association in 1923. No important changes are made in this edition, but some sections have been modified to accord with recent developments, as for instance the section on "Structural Design—Concrete Construction."

SWITCHBOARD INSTRUCTION BOOK

The installation, operation and maintenance of switchboards is fully covered in a new 120-page book, paper bound, issued by the General Electric Company. This book, bearing the number 87000-E, is profusely illustrated with photographs, diagrams, tables, formulas, etc. It contains much varied information of especial value to those engaged in the construction, installation and maintenance or operation of switchboards.

LINK-BELT CATALOGUE

The Link-Belt Company, of Chicago, has recently published a new 68 page book describing new methods for handling coal and ashes in boiler houses. It shows installations of the Peck Carrier in many public buildings and industrial plants. It contains many data of interest to engineers and architects.

CONCRETE ROAD BUILDING

The Western Wheeled Scraper Co., of Aurora, Ill., has issued a catalog with the above title describing its batch boxes, road builders' trucks, road builders' dump cars, and industrial haulage system. In 18 pages, 8½ x 11, it describes these various products and gives many illustrations of them and of scenes where they are in actual service.

NEWS OF THE SOCIETIES

Sept. 22-24 — CANADIAN GOOD ROADS ASSOCIATION. Twelfth annual convention at Quebec, Canada.
Sept. 28-Oct. 2—NATIONAL SAFETY COUNCIL. Annual congress at Cleveland, Ohio.
Sept. 28-Oct. 4—INTERNATIONAL CONGRESS OF CITIES. To be held at Paris, France.
Oct. 3-13 — PAN-AMERICAN ROAD CONGRESS. To be held at Buenos Aires, Argentina.
Oct. 5-6—MASSACHUSETTS FEDERATION OF PLANNING BOARDS. Twelfth annual conference on city planning at Boston, Mass.
Oct. 12-13—LEAGUE OF VIRGINIA MUNICIPALITIES. Annual convention at Winchester, Va.
Oct. 12-13—SOUTHWEST WATER WORKS ASSOCIATION. Convention at Tulsa, Okla.
Oct. 14-16—AMERICAN SOCIETY OF CIVIL ENGINEERS. Fall meeting at Montreal, Quebec.
Oct. 15-17—CALIFORNIA SECTION AMERICAN WATERWORKS ASSOCIATION. Sixth annual convention at Santa Cruz.
Oct. 19-22 — AMERICAN PUBLIC HEALTH ASSOCIATION. Annual convention at St. Louis, Mo.
Oct. 26-29—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention at Des Moines, Iowa.
Nov. 17-19—INTERNATIONAL CITY MANAGERS' ASSSOCIATION. Annual convention at Grand Rapids, Mich.
Nov. 18-20—ASSOCIATION OF STATE HIGHWAY OFFICIALS. Annual meeting at Detroit, Mich.
Jan. 11-15, 1926—AMERICAN ROAD BUILDERS' ASSOCIATION. Annual convention and road show at Chicago.
Feb. 23-26—AMERICAN CONCRETE INSTITUTE. Annual convention at the Sherman Hotel, Chicago, Ill.

SAFETY CONGRESS

The Fourteenth Annual Safety Congress will be held at Cleveland, Ohio, September 28 to October 2 inclusive. The discussions will be divided into a number of sections and will meet at different rooms in the Statler, Winton and Cleveland Hotels. Among the subjects taken up by the different sections will be Automotive, Cement Constructions, Health Surveys, Mining, Paper and Pulp, Steam Railroad, Wood-working. The subjects of special interest to readers of Public Works are those under the general head of Public Safety Section. Under this head the following papers are scheduled:

Street and Highway Signs and Progress for Standardization, by E. W. James, Chief of Division of Design, Bureau of Public Roads.

Traffic Control Systems, by M. O. Eldridge, Director of Traffic, Washington, D. C.

Pavement Markings, by Major Thomas H. Allen, Commissioner of Fire and Police of Memphis, Tenn.

Safe Construction and Equipment of Highways, by Frank F. Rogers, State Highway Commissioner of Michigan.

Non-traffic Street Hazards, by H. W. Lueck, Commonwealth Edison Company, Chicago, Ill.

There will be a Safety Exhibit in the Rainbow Room of the Winton Hotel.

ALL-WESTERN ROAD SHOW

A Road Show is to be held in San Francisco on November 9 to 14 under the auspices of the Western Construction Equipment Distributors. A separate day is set apart for each group of visitors: Tuesday being Engineer Day; Wednesday, Supervisors' Day; Thursday, Contractors' Day; and Friday, Dealers' Day.

The Executive Committee has received orders for exhibition space from many of the leading manufacturers of the East and the ground plans provide for an area of 100,000 square feet for exhibits. Eighteen acres on the site of the International Exposition have been engaged for the Show.

CALIFORNIA SECTION, AMERICAN WATER WORKS ASSOCIATION

This section will hold its sixth annual meeting at Santa Cruz, October 15th to 17th.

IOWA SECTION A. W. W. A.

The Iowa Section of the American Water Works Association will hold a meeting at Dubuque, Iowa, the latter part of November, probably the 25th to 27th. The secretary of this section is Jack J. Hinman of Iowa City.

LEAGUE OF CALIFORNIA MUNICIPALITIES

The 27th Annual Convention of the League of California Municipalities will be held in the Hotel Virginia, Long Beach, California, September 28th to October 3rd. Norman E. Malcolm, president of the League, has notified the cities of the state that every city or town official is entitled to attend the convention and participate in the discussions.

BOSTON SOCIETY OF CIVIL ENGINEERS

On Wednesday, September 30, this Society will discuss the subject of traffic problems, the principal speaker being G. H. Delano, Maintenance Engineer of the Division of Highways of the Massachusetts Department of Public Works, who will present a paper on "Some of the Problems of Highway Operation," covering the subjects of lights, signs, widths, curves, cross streets, etc.

ASSOCIATION OF STATE HIGHWAY OFFICIALS

The American Association of State Highway Officials will hold its annual convention at Detroit, Michigan, on November 18 to 20. Among the papers to be read are the following: "Economies and Methods of Widening and Strengthening Pavement" by William H. Connell; "Highway Police and Highway Safety Devices" by John A. Macdonald; "Are Toll Bridges and Toll Ferries Justified on a State Highway System?" by William E. Atkinson; "Fundamental Principles Governing Collection and Expenditure of Gasoline Taxes" by Ray A. Klein; "Our International Relations as Shown by the Pan-American Congress at Buenos Aires" by Thomas A. McDonald; "Pay-as-You-Go Plan of Highway Finances" by J. T. Donaghey. The report of a board appointed to select a system of transcontinental and inter-sectional highways, to be marked uniformly and equipped with uniform safety devices, will be presented by E. W. James, chief of the Division of Design, United States Bureau of Public

U. S. CIVIL SERVICE EXAMINATIONS

Engineer, Associate Engineer and Assistant Engineer. Applications received until October 20. To fill vacancies in the Federal classified service. Entrance salaries $3800, $3000 and $2400 respectively, with possible advance without change in assignment to $5000, $3600 and $3000 respectively. Duties, in connection with original research investigation, or design and construction in the following specialized branches of engineering: Ceramic, civil, electrical, materials, mechanical, naval architecture, radio, or any other specialized branch.

Junior Technologist. Applications received until October 10. Entrance salary $1800 with possible advance without change in assignment to $2400 a year. Duties include many branches of physics, chemistry and engineering, such as mechanics, heat, optics, electricity, sound, meterology, metallurgy, radio, electronics, engineering (gas, electrical, mechanical, etc.), also industrial technology, including research and standardization.

Assistant Mechanical Engineer. Applications received until October 10. To fill vacancies in office of the Supervising Architect, Treasury Department at Washington, D. C. Entrance salary of $2400 with possible advance without change in assignment up to $3000 a year according to qualifications. Duties consist of making calculations and preparing drawings and specifications and estimates of cost for heating and ventilation of public buildings and hospital buildings or groups of buildings and for mechanical equipment pertaining thereto; inspecting and testing heating and ventilating apparatus in the field and preparing reports of these inspections and tests.

Assistant Civil Engineer. Applications received until October 6. To fill vacancy in Office of Indian affairs for duty at San Carlos, Ariz. Entrance salary $2400 with possible advance without change in assignment to $3000 a year. Duties, to assist in design of Coolidge Dam and its appurtenant works and in the computations connected therewith.

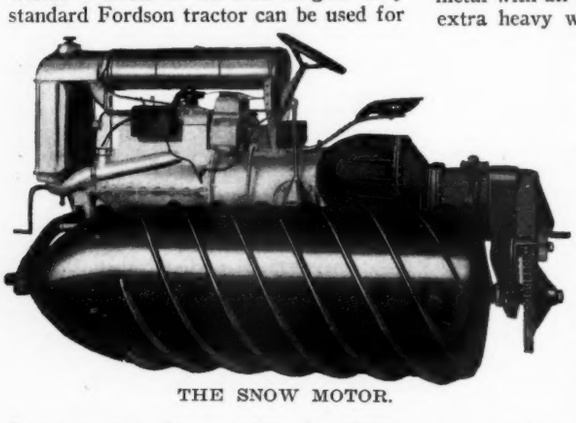
Junior Cartograph Engineer. Applications received until October 3. To fill vacancies in the Coast and Geodetic Survey. Entrance salary $1800 with advancement in pay without change in assignment up to $2400 a year. Duties consist in utilizing data resulting from field surveys of the Bureau, in compiling and correcting nautical charts which guide all vessels traversing the navigable tidal waters of the U. S., and other technical work in related physiographic problems.

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

THE SNOW MOTOR

Snow Motors, Inc., of Detroit, Mich., manufactures under the name of the Fordson Snow Motor, a machine which it claims will travel and draw heavy loads over snow of any depth or consistency. Aside from its motor power, the Fordson tractor, the snow motor consists of two torpedo-shaped drums or cylinders to which are welded flanges or spiral runners resembling corkscrews. One of these drums it attached to each side of the tractor with its axis parallel to the direction of motion and the two revolve in such a way that the spiral flanges, engaging in the snow or ice, draw the machine forward. The object of the torpedo-shaped ends of the drums is to press down the snow and prepare the surface for traction. Steering is accomplished by driving one drum faster than the other and a motor can turn within a circle of its own length. Any standard Fordson tractor can be used for



THE SNOW MOTOR.

the snow motor by removing the wheels and axles, which can be replaced for Summer use.

Owing to the peculiar method of locomotion, it is claimed that where another vehicle digs itself in, the snow motor digs itself out. It leaves a wide track on each side, the drums being 30 inches in diameter and the tread 58 inches between centers of drums, and thus breaks roads in snow over which automobiles and other conveyances can follow. It can also draw heavy loads, and during one test pulled two heavy sleds loaded with logs weighing twenty tons. It is said that it can travel at the rate of twelve miles an hour or even faster. The snow motor was invented by an Alaskan miner, F. R. Burch, and about ten years ago a mining engineer, Col. H. H. Armstead, purchased the patents and the snow motor received some attention at that time under the name of the Armstead snow motor. Recently others, including some leading automobile manufacturers, have become interested with Mr. Armstead, and the Snow Motors Company has been formed for the manufacture of the Snow motor, with A. F. Knoblock as president and general manager, Col. Armstead as vice-president, and H. H. Emmons as secretary-treasurer.

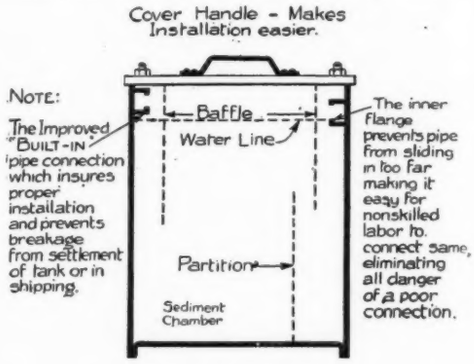
WALDRON VALVELESS PUMPS

The Waldron Company, of Lewiston, Me., is introducing a novel pump which contains no valves, boxes, fans, packing or vacuum chamber; contains no intricate parts and requires no priming. It will handle any liquid heavily polluted with any kind of sediment. It is especially recommended for cofferdams, sewers, ditches, etc. In general, the pump consists of a hollow inverted frustrum of a cone which is revolved rapidly, the wider base being at the top.

MOHAWK SEPTIC TANK

The Mohawk Asphalt Heater Company, of Schenectady, N. Y., manufactures a septic tank made of 14-gauge metal with all seams and pipe connections extra heavy welded. The complete tank is given a heavy coating of natural mineral asphalt inside and out, applied hot, giving protection from rust or chemical action. A special feature is the location of the pipe connections inside of the tank rather than out, which eliminates trouble from distorted and broken pipe collars and permits the tanks to be rolled in handling without danger of damaging the connection. The pipe connection has an inner flange which prevents sliding the pipe too far into the tank when setting it.

The tanks are made in three standard sizes with capacities of 200 gallons, 300 gallons and 500 gallons, respectively. The two first have a depth of 48 inches and the last a depth of 72 inches.


Cover Handle - Makes Installation easier.
NOTE:
The Improved "BUILT-IN" pipe connection which insures proper installation and prevents breakage from settlement of tank or in shipping.
Baffle
Water Line
Partition
Sediment Chamber
The inner flange prevents pipe from sliding in too far making it easy for nonskilled labor to connect same, eliminating all danger of a poor connection.

MOHAWK SEPTIC TANK.

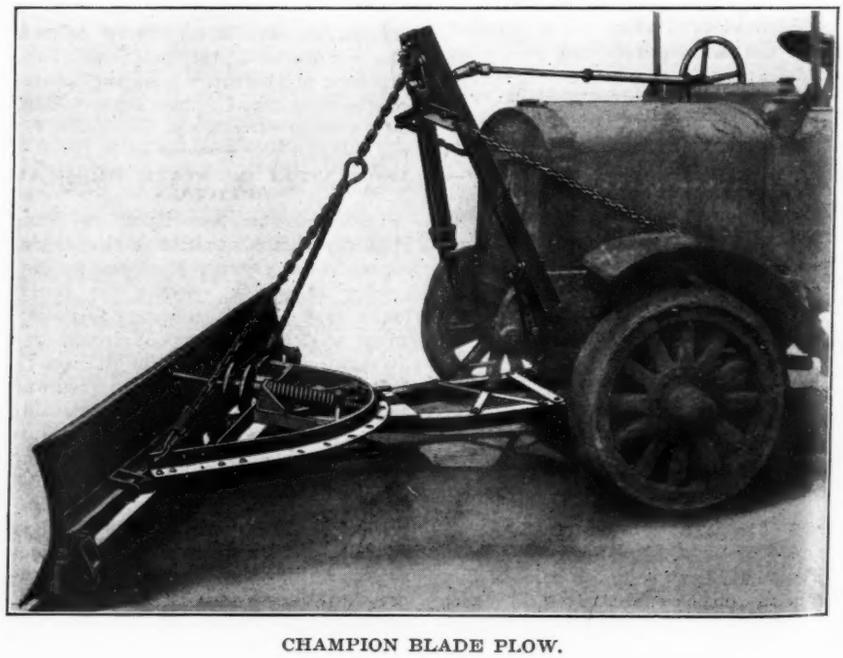
CHAMPION SNOW PLOWS

The Good Roads Machinery Company of Kennett Square, Pa., offers for removing snow from highways a Blade Snow Plow and a V Type Snow Plow, both under the name "Champion."

The blade snow plow consists of a steel scraper blade 10 feet long and 20 inches wide, which is hung from a semi-circular steel frame providing angular adjustment and making it possible to set the scraper for either right or left hand cuttings and at any desired angle. It can, therefore, be used to push the snow toward either the gutter or the center of the street, or forward toward a manhole or dump.

The following features are considered especially important: By means of an automatic blade release, if the cutting

(Continued on page 46)



CHAMPION BLADE PLOW.

INDUSTRIAL NOTES

UNIVERSAL PORTLAND CEMENT COMPANY

Following the recent death of T. J. Hyman, formerly secretary and treasurer of the Universal Portland Cement Company, E. B. Harkness was elected secretary, and A. W. Carlisle was elected treasurer. O. N. Lindahl was appointed assistant secretary in addition to his office as auditor.

SAND SPUN PIPE

R. D. Wood & Company of Philadelphia recently received bids for the construction of a plant at Florence, N. J., for the production of 400 tons daily of cast-iron pipe made centrifugally by the sand spun process. A similar plant is being constructed at Birmingham, Ala., with an output of 500 tons daily.

INTERNATIONAL CEMENT CORPORATION

The International Cement Corporation anounces that H. C. Koch has been appointed vice-president in charge of sales and publicity for the domestic and foreign properties of the International System. Upon the completion of the Norfolk plant of the Virginia Portland Cement Corporation, Ejnar Posselt will assume the duties of vice-president in charge of operation and construction.

R. D. WOOD COMPANY REPRESENTATIVE

R. D. Wood & Company, of Philadelphia, has just appointed as its district representative with headquarters in the Bona Allen Building, Atlanta, Ga., C. R. McGahey, formerly with the Worthington Pump & Machinery Corp., who will have the territory including North and South Carolina, Georgia and Alabama, and will devote particular attention to the water works equipment department.

NEW CATALOGS

BAKER MANEY SELF-LOADING SCRAPERS

The Baker Manufacturing Co., of Springfield, Ill., has issued a new catalogue describing the Baker Maney self-loading scrapers, tractor-drawn models. All details of construction are fully described and illustrated and also the use of the different sizes for various kinds of work. 32 pages 7x10½.

W. & T. CHLOROMETER

Wallace & Tiernan, of Newark, N. J., in a new 8-page catalog, describes a contrivance for the automatic proportional application of relatively small quantities of chlorine sterilizing solution or other chemicals in solution.

WESTINGHOUSE NEW CATALOG

The Westinghouse Electric and Manufacturing Company is distributing its new 1925-27 catalog of electrical supplies which lists all the apparatus manufactured by the company or obtainable through its district offices or agent jobbers. The catalog contains 1,200 pages and 4,500 engravings. Four indexes are furnished, a subject index, a style number index for checking invoices, a classified index, and a thumb index.

BATCHER PLANTS

The Blaw-Knox Company of Pittsburgh has just published a new catalog entitled, "Batcherplants for the General Contractor," in which is described proportioning by volume, by weight and by inundation; with descriptions and illustrations of the various kinds of equipment furnished by the company for measuring and mixing concrete. The catalog contains 20 pages, 8½x11.

PENNSYLVANIA AIR COMPRESSORS

The Pennsylvania Pump and Compressor Company, of Easton, Pa., has issued three new bulletins on the general subjects of aftercoolers; compressors and vacuum pumps; and portable air compressors. These are illustrated and contain detailed descriptions of the various classes of equipment.

The telephone door

More people enter our homes and offices by telephone than in person. Through the telephone door, traveling by wire, comes a stream of people from the outside world on social and business missions. Important agreements or appointments are made, yet the callers remain but a few seconds or minutes and with a "good-bye" are gone. We go out through our telephone doors constantly to ask or give information, buy or sell things, make personal calls and on dozens of other errands.

None of the relations of life is more dependent upon co-operation and mutual consideration than these daily millions of telephone journeys. It is the telephone company's part to furnish the means of calling and to place courteous and intelligent employees at the service of the public. Good service is then assured when there is a full measure of co-operation between users.

Only by mutual care and consideration can everyone enjoy the full pleasures and benefits of calling. Telephone courtesy is for the good of all who use the telephone door.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES
BELL SYSTEM
One Policy, One System, Universal Service

edge should strike an obstacle the blade passes over it and immediately returns to its operating position. The axle clamp is so designed that the plow can be attached readily to any truck on the market; the clamp being fastened to the front axle by two large machine bolts.

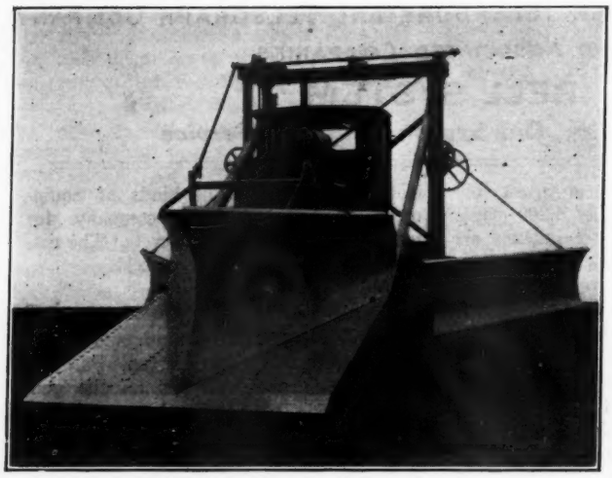
The vertical movement of the scraper blade is controlled by means of a large hand wheel at the driver's seat. The lifting device can be attached to a radiator of any type by means of legs which support a worm and gear housing, angle supports and brace chains to the truck frame holding the lifting device in a vertical position. To the bottom of the side members are attached swivel brackets by means of which the lifting device can be attached to the front end of any truck of any shape or size. The scraper blade can be tilted backward or forward by means of a steel or screw mechanism. The moldboard is of 5/16" carbon steel 10 ft. long by 17½ in. wide, and carries an edge of ¼-in. carbon steel 6 in. wide which can be renewed when worn. For small trucks and tractors a moldboard 8 ft. long is furnished.

The V type snow plow consists of an inclined platform either attached to the tractor or carried on runners, with a V type moldboard 8 feet wide by 5 feet high mounted on it. A widening wing 30-in. high by 12 ft. long is attached to each side of the tractor back of the plow proper, this enabling the plow to clear a total width of 17 ft. The plow can be raised 12-in. from the ground by means of a positive worm and gear lifting device connected by chains to the plow. A smaller lifting device raises or lowers either or both of the widening wings, thus permitting crossing narrow bridges or passing vehicles.

The platform is of heavy steel plate carried on steel channels with replacable cutting edge and runners. The moldboard is of heavy steel plate thoroughly reinforced with steel angles. The push members are of wood and steel, wood being used for compression members wherever possible.

This plow lifts the snow onto the inclined platform and rolls it upward and sideways, thus eliminating the packing and wedging that occurs with the ordinary V plow. The plow may be attached either to tractors that can carry it direct, such as the Linn, or those which do not permit of direct connection, such as the Holt. In the former, supporting rollers or sleds are necessary only at the cutting edge; while in the later type, both plow and wings are supported on auxiliary runners or sleds. The plow is attached to the front end of the Linn tractor by two drop pins and the lifting device is clamped by hook bolts to the body of the tractor. The plow is attached to the Holt tractor by a simple drawbar pin and two brace chains at the rear of the tractor.

The nose of the plow is five feet high and eight feet wide. The width with the plow wings up is 13 ft. 3-in. and with them open 21 feet. The height over all is 11 ft. 10-in. The weight is approximately 7,000 pounds.



CHAMPION V-TYPE SNOW PLOW.

GUARD RAIL FITTINGS

Hubbard & Company, of Pittsburgh, furnish fittings to be used in installing cable guard rails along highways. These include drop forged eye bolts, wire rope clips, post clamps, bearing plates, turnbuckles and anchors for cables in both earth and rock.

NEW RUSSELL MOTOR PATROL.

RUSSELL MOTOR PATROL

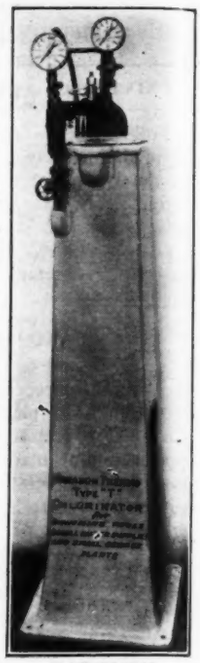
The Russell Grader Manufacturing Company of Minneapolis, has recently added to its line a motor patrol which uses a Fordson tractor for power, the unit being furnished either with or without the tractor. The low speed of the tractor is used for heavy grading and for scarifying hard roads; the intermediate speed for maintenance work; and the high speed for moving from place to place or for very light maintenance work. In filling wash-outs, holes or ruts, or repairing a very short piece of bad road, the motor patrol can be worked forward and backward until the job is done.

The blade is fully reversible and may be tilted forward and backward from a levelling to a cutting position and can be shifted to either side of the frame. Both blade and cutting edge are made of high-carbon steel in 8-foot, 10-foot or 12-foot length. The frame is made from an extra heavy 7-inch channel, heavily braced. The front wheels carry 32x3½-inch rubber tires and the rear wheels 40x5-inch dual cushion rubber tires.

Rubber tire wheels are considered preferable on about 95 per cent of the work —they have better traction, are more resilient and do not pick up road material or otherwise mar the road surface.

The operator stands in a comfortable position at the rear of the tractor with full view of the blade and the road ahead and with all adjustments within easy reach. The steering device is of the worm and gear type. The weight without tractor is 2,835 pounds and with tractor 8,050.

A scarifier attachment weighing 565 pounds is independently adjustable, the width of the scarifier block being 40 inches. The 10 teeth, 2½ inches by ¾ inch, are spaced 4⅛ inches apart. The Alemite system of lubrication is used for all principal parts. The motor has a wheel base of 14 feet 5 inches, which insures smooth and uniform work.



PARADON THERMO TYPE T CHLORINATOR

CHLORINATOR FOR SMALL SUPPLIES

The Paradon Engineering Company, of Long Island City, has developed a small-capacity simplified chlorinator designed especially for small waterworks and sewage plants and swimming pools, known as the thermostatically controlled type T unit. It is designed as a sturdy, fool-proof chlorinator that can be operated by the class of unskilled attendants available at a small plant.

It consists of a white vitrified enameled pedestal having a compartment which holds a small cylinder of chlorine generally about 12 pounds capacity. A silver control valve regulates the flow of chlorine from the cylinder and a volumetric type of measuring meter indi-

125th Street and Broadway is one of the busiest corners in New York City.

Approximately 200 feet of track on 125th Street and 100 feet on Broadway had to be removed, the grade of tracks changed, new yokes and duct manholes installed, and new foundations placed for granite blocks between and outside of railroad area.

Lumnite Cement Concrete was used and put in service within 24 hours—this meant practically no interruption to traffic at this important intersection.

For such occasions Lumnite is invaluable.

THE ATLAS LUMNITE CEMENT COMPANY
ATLAS LUMNITE CEMENT
TRADE-MARK
NEW YORK, N.Y.

Traffic Interference, in New York City, *prevented through* LUMNITE

LUMNITE CEMENT gives full-strength 28-day concrete in 24 hours, thus saving time and money on important construction where delay would be expensive. Lumnite Cement is *not* quick-setting, but allows the usual time for pouring and removal of forms. It is after the initial set that it attains its ultimate strength so quickly.

This use of Lumnite in New York is just one demonstration of the results it secures.

For highway work, for railroad construction and maintenance, for general construction and every sort of emergency work, Lumnite is being used where speed is essential.

Although Lumnite is still a comparatively new product in this country, it has been widely used by practically every State Highway Department east of the Mississippi, by leading municipalities, by important railroads and traction companies, by such firms as the Turner Construction Company, Albert Kahn, Incorporated, the Standard Oil Company.

Remember, wherever speed is desired in concrete—*Lumnite will give 28-day-strength concrete in 24 hours.*

Send for the illustrated Lumnite Book with fifty stories of Lumnite's time- and money-saving performance.

THE ATLAS LUMNITE CEMENT CO.

***25 Broadway*, New York City**

134 So. La Salle St., Chicago, Ill. **2000 First Ave., Birmingham, Ala.**

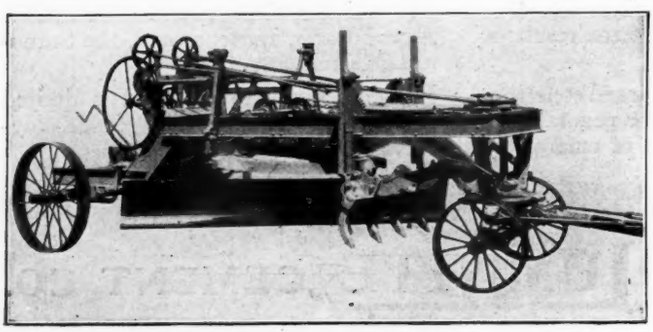
cates the amount of chlorine flowing, the meter being enclosed in a glass cylinder. An injector operated by auxiliary water supply draws the chlorine from the glass cylinder and carries it to the point of application, in either pipe line or open body of water. Part of the water flowing through the injector is bypassed and forms a water jacket around the outside of the chlorine cylinder, which keeps the chlorine at a constant temperature and therefore gives a constant flow for any one setting of the control valve. Gauges show the pressure of both chlorine and water. Water under pressure of at least 20 pounds per square inch is necessary to operate the apparatus.

The machine is constructed of material that will not corrode in the presence of moist chlorine. Uniform temperature of chlorine eliminates the necessity of a compensating reducing valve. The chlorinator and chlorine cylinder are in one self-contained and compact unit. This apparatus will handle up to approximately two pounds of chlorine in 24 hours. It is suitable for water supplies up to 100,000 gallons per 24 hours or for sewage plants up to 50,000 gallons per 24 hours. It is offered as especially suitable for water, and sewage plants at institutions, camps, hotels, etc.

THE GRADEFIER

The Stockland Road Machinery Company of Minneapolis has recently developed for road work a new scarifier tooth designed like a rooter plow to dig in and hold its position under a hard crust without the excessive weight of a heavy block. In this way the tooth is not only forced under the pavement and kept in place, but the grader is held rigid without any tendency toward elevating the front wheels. The scarifier block is operated independently of the blade. It is of cast steel with detachable teeth having replaceable tips of chrome molydenum. The draw bars are 1¼x5″ high-carbon steel and are attached to the front bench by a cast steel nose. The block is held rigid against side thrust by two braces riveted to the draft bars and attached to the nose. The pitch of the block can be changed for different types of work, and it may be removed when it is desired to use only the blade in ordinary road construction. Tests recently made by the Arkansas State Highway Department in scarifying the top crust of a highway showed that with this design of tooth the 3,000 lb. block usually used for such work was unnecessary.

The blade is suspended by means of a straight bar across the extreme rear of the circle, which eliminates loose play. Other changes in the blade attachment facilitate fast operation and give increased rigidity.



STOCKLAND "GRADEFIER."

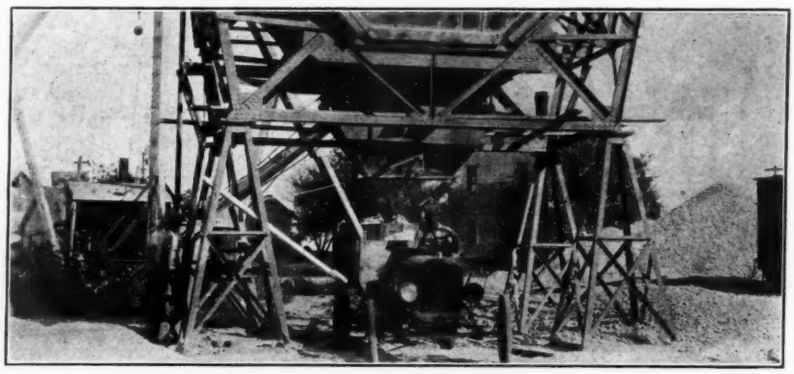
IDEAL SANITARY CLOSET

The Etowah Foundry and Machine Company, of Gasden, Ala., manufactures a cast-iron riser to be used in the construction of a sanitary closet such as is required by some of the southern states, counties or other districts, to which it gives the above name. This consists of an oval iron pipe-like casting which is used as support for the seat. In construction, a form is made for a rectangular slab to be placed over the top of the pit, the riser is placed in position and the concrete poured around it inside of the form. After having set for 48 hours, the concrete slab with the riser embedded in it is lifted and placed in position, and the building is then constructed over it as usual. The riser is coated with a tar preparation and the wooden seat and lid are treated with creosote.

WEIGHING CONCRETE AGGREGATE

The Blaw-Knox Company, of Pittsburgh, now furnishes an apparatus for measuring concrete aggregates by weight. This consists of a hopper or weighing batcher suspended beneath the sand and stone openings of the bin and so arranged that both the fine and coarse aggregates are contained therein, although the materials are kept separate by means of a steel partition. The flow of material from the storage bin to the hopper is controlled by a roller bin gate which is a Blaw-Knox patent. The weighing batcher or hopper is connected to a standard beam scale by an overhead system of levers which can be operated by one man.

In use, the scale is set for the correct weight of the stone. After this has been weighed the scale is then set for the combined weight of both sand and stone and the sand is then admitted into the batcher until the combined weight is reached. The materials are then discharged into the truck or the mixer hopper through a simple latched counterweight bottom-dump door.



BLAW-KNOX WEIGHING BATCHER.

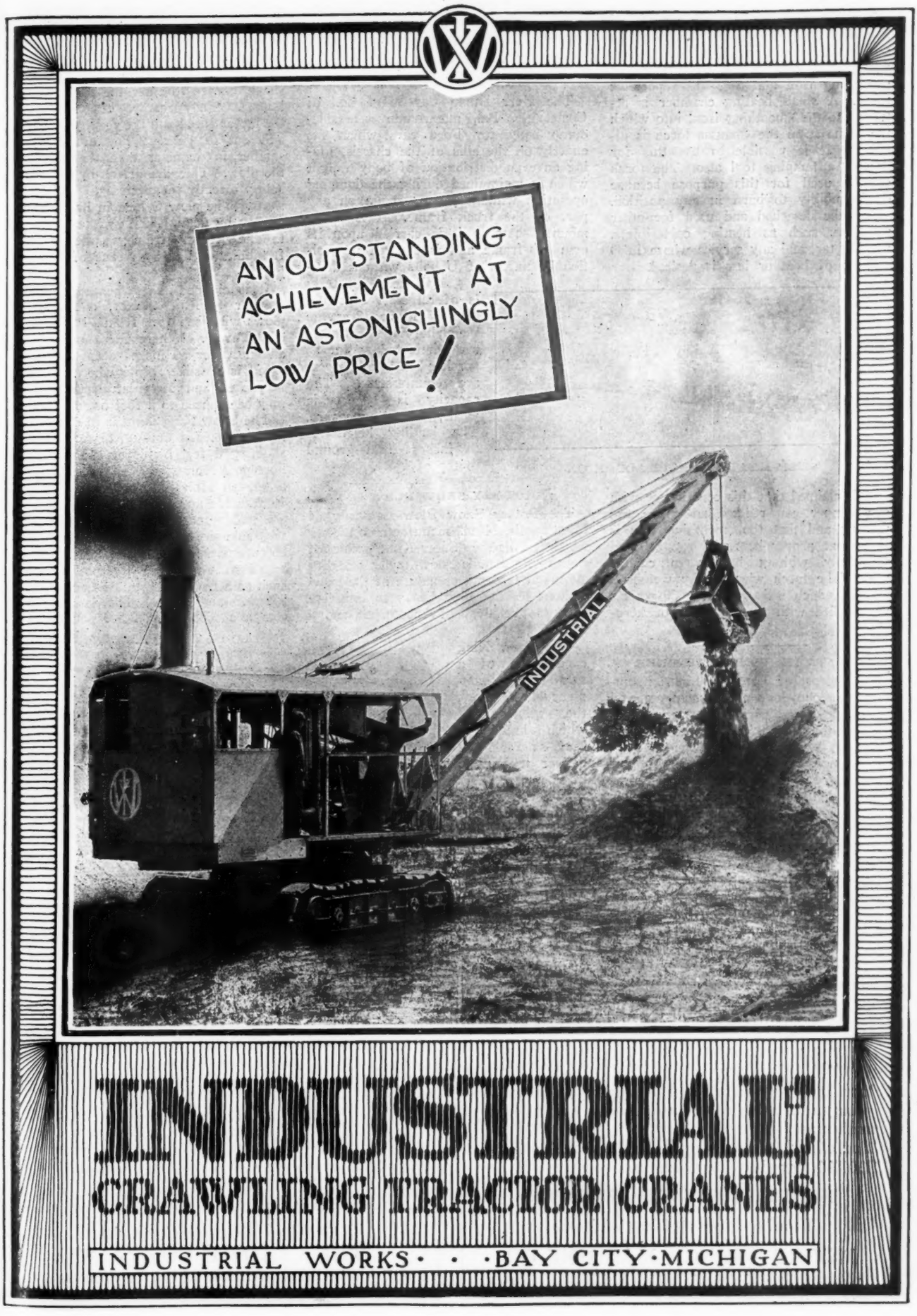
NEW JERSEY SNOW FENCE

The Good Roads Machinery Company of Kennett Square, Pa., manufactures a snow fence known as the New Jersey Snow Fence to prevent snow from drifting on to highways. The fence is placed some distance from the highway and causes the snow to pile up back of the fence and keep the highway practically clear when wind causes drifting. The distance from the road varies from fifty to three hundred feet depending on the slope of the land. The fence is a combination of pickets interwoven with number twelve gauge heavily galvanized double-strand wire. The pickets are of New Jersey white cedar two inches wide and one-half inch thick and are spaced two and one-quarter inches apart. They are either stained red or natural. The fence is fastened to posts of either wood or angle iron set from ten to sixteen feet apart. The fence can be taken down in the spring and put up again in the fall at very little expense.

HARD-N-TYTE SURFACE HARDENER

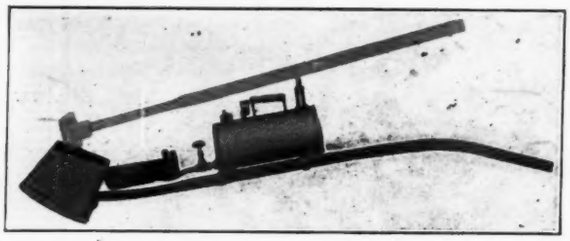
The General Chemical Company, of New York, prepares a metallic fluosilicate compound which hardens portland cement mixture, which it calls "Hard-n-tyte." When mixed with water it forms a colorless solution which penetrates and hardens a concrete surface. By a chemical reaction it deposits finely divided silica in the pores or voids and also forms what is known as fluorspar. These deposits themselves sustain heavy wear and weathering.

The makers claim that when used on concrete roads it increases the resistance to abrasion and protects it against frost and the penetration of oil from passing vehicles.


AN OUTSTANDING ACHIEVEMENT AT AN ASTONISHINGLY LOW PRICE!
INDUSTRIAL
INDUSTRIAL
CRAWLING TRACTOR CRANES
INDUSTRIAL WORKS · · ·BAY CITY·MICHIGAN

SELF-HEATING ASPHALT IRON

The Chausse Oil Burner Company, of Elkhart, Ind., has recently produced a self-heating asphalt smoothing iron which is a combination of a standard smoothing iron and a Chausse portable torch. A small heating chamber is attached to the smoothing iron, into which the flame from the Chausse torch is directed. It is possible to use this for heating a tamping tool also. The torch can be used for this purpose because of its ability to burn in any position. It can be detached and used for other purposes, such as heating cold joints, melting tar, and any service where 1,800 degrees of heat or less is desired.



SELF-HEATING ASPHALT IRON

It is claimed that this contrivance with one tamper can replace an entire fire wagon; and that the smoothing iron is always at proper heat and can be used constantly without having to change tools. The torch when empty weighs 9 pounds, which is increased to 30 pounds when filled with three gallons of kerosene.

CONCRETE WELL STRAINER

F. Thorpe, of East St. Louis, manufactures Schnyder's porous concrete well casing and strainer, for which it is claimed that it does not choke up, corrode or otherwise deteriorate. Watertight concrete is used from the surface of the ground to the water-bearing stratum, and through this the concrete is made porous and it is claimed well passes 10 gallons per minute per square foot. The pores are so fine that no sand can enter the well. In constructing a well, a temporary steel casing is sunk by means of sand bucket, or otherwise, and about five porous sections on top of a cutting edge are lowered into it, being strung on four vertical rods. The casing is sunk by any usual method and when it has reached the desired depth, the bottom is filled with concrete and the temporary steel casing is withdrawn.

HERR SIDE-DUMP BODIES

The Herr Dump Car Mfg. Co., of Coatesville, Pa., manufactures a side-dump body for Ford cars which fits exactly on the sills of the chassis, giving an even distribution of body weight which is maintained during the dumping operation without jar or strain on any part of the truck frame. It is easily mounted because it is carried upon its own sub-frame and is secured in position by means of U bolts without drilling any hole. The body is of all steel construction of 10 or 12 gauge metal, hot riveted. Seams are eliminated as far as possible and all rivets are countersunk. The capacity is 1¼ cubic yards, water measure. The loading height is 51 inches from ground to top of body.

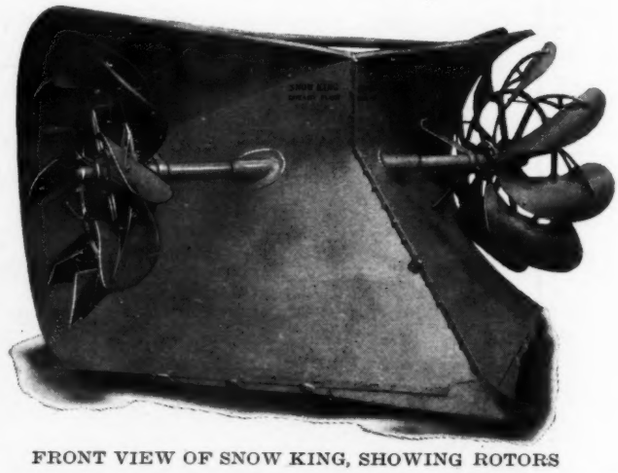
ROTARY SNOW PLOW

The Rotary Snow Plow Company of Minneapolis, Minn., manufactures a plow which it calls the "Snow King," which it claims will handle snow under all conditions as to depth or nature of the snow without leaving high banks to interfere with the removal of subsequent snowfalls.

The Snow King consists of a strongly constructed V plow, the wings of which break up the snow and deliver it to two rotors. These rotors are placed at the outer ends of the plow wings and throw the snow far to the sides of the road. This has an additional advantage of relieving the pressure against the wings, which reduces the power necessary to force them through the snow. The rotors are mounted on adjustable, tapered roller bearings and are driven by extra heavy shafts. The fans are of the bird wing shape, curved to enter the snow without impact. They revolve at one-third of the motor speed and are readily thrown in and out of gear. They are one foot smaller in diameter than the height of the plow. They are driven by the motor, being directly connected to the crank shaft. The plow is held in line with the tractor by heavy hitch brackets attached to the tractor frame, while complete flexibility is had by means of universal joints.

It is claimed that when used with a crawler type of tractor, one of these plows will keep open from 20 to 30 miles of highway. Where the snow is light and not over 30 inches deep the highest speed is possible, while where the snow is packed and of great depth progress may be reduced to a foot or so at a time.

The Snow King is made in three sizes: Model No. 126 cutting 12 ft. wide and standing 6 feet high, for use with a 60 horsepower crawler type tractor such as a ten-ton Holt; Model No. 106 cutting 10 ft. wide and standing 6 feet high for use under severe conditions, attached to the same size of tractor; and Model No. 85 cutting 8 feet wide and standing 5 feet high for use with a 40 horsepower tractor, such as a five-ton Holt, Best, Bear, "30," "J. T." and Linn. The last weights, complete with hitch, 3,500 pounds.



FRONT VIEW OF SNOW KING, SHOWING ROTORS

MR. SEWER CONTRACTOR

Did You LOSE Last Year?

You had good machines, but you struck wet going and some of it was deep. You had to timber and there wasn't room to handle things. You didn't know that you could save $60.00 to $100.00 per day by using a

MORETRENCH CONVEYING EXCAVATOR

Proof? Plenty of it. Write us.

MOORE TRENCH MACHINE CO.

ROCKAWAY, NEW JERSEY

TRADE **"LEADITE"** MARK

Registered U. S. Patent Office

FOR JOINTING CAST IRON WATER MAINS

NO CAULKING

Saves 50% to 75%

LEADITE is the pioneer self-caulking substitute for pig lead.

Be Sure It Is LEADITE and Accept No Imitations.

Leadite Joints Improve with Age

THE LEADITE COMPANY

1511 LAND TITLE BUILDING, PHILADELPHIA, PA.

NEWS OF THE SOCIETIES

Oct. 19-22—AMERICAN PUBLIC HEALTH ASSOCIATION. Annual convention at St. Louis, Mo.

Oct. 21-23—ASPHALT ASSOCIATION. Annual paving conference at Detroit, Mich.

Oct. 26-28—LEAGUE OF KANSAS MUNICIPALITIES. Annual convention at Ottawa, Kans.

Oct. 26-29—AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS. Annual convention at Des Moines, Iowa.

Nov. 17-19—INTERNATIONAL CITY MANAGERS' ASSSOCIATION. Annual convention at Grand Rapids, Mich.

Nov. 18-20—ASSOCIATION OF STATE HIGHWAY OFFICIALS. Annual meeting at Detroit, Mich.

Dec. 2-4—IOWA SECTION, A.M. WATER WORKS ASSOCIATION. Annual convention at Dubuque, Ia.

Dec. 3-4—HIGHWAY RESEARCH BOARD. Annual meeting at Washington, D. C.

Jan. 11-15, 1926—AMERICAN ROAD BUILDERS' ASSOCIATION. Annual convention and road show at Chicago.

Feb. 23-26—AMERICAN CONCRETE INSTITUTE. Annual convention at the Sherman Hotel, Chicago, Ill.

NORTH CAROLINA SECTION—AMERICAN WATERWORKS' ASSOCIATION

The convention of the North Carolina Section was held September 15th and 16th in Asheville. It is reported to have been a very successful one, there having been a total attendance of about 175, quite a number of which were from out of the state. The exhibit of manufacturers' equipment was considered to have been superior to that displayed at the convention of the National Association at Louisville. The general convention was preceded by the Second Annual Conference of Filter Plant Operators on September 14th, at which there was an attendance of about forty operators from North Carolina.

AMERICAN ROAD BUILDERS' ASSOCIATION

The Nominating Committee of the American Road Builders' Association has announced the official nominations for officers for 1926-7 as follows: for presdent, H. G. Shirley, Chairman of the state highway commission of Virginia; for vice presidents, W. R. Smith, president of the Lane Construction Corporaton of Meriden, Conn.; S. T. Henry, Director of the Pan-American Confederation for Highway Education, N. C.; S. F. Beatty, vice president of the Austin-Western Road Machinery Co.; and Samuel Hill, honorary president of the Washington State Good Roads Association. For treasurer, James H. MacDonald, consulting road expert of New Haven, Conn. For directors for three years, W. H. Kershaw, manager of the asphalt sales department of the Texas Company; C. M. Pinckney, chief engineer of the Borough of Manhattan, New York City; Frederic A. Reimer, consulting engineer, East Orange, N. J.; R. Keith Compton, director of public works, Richmond, Va.; Charles M. Upham, state highway engineer of N. C.; William Ogden, Lakewood Engineering Co., Cleveland, Ohio, and Frank Terrace president of the Washington State Good Roads Association.

AMERICAN WATERWORKS ASSOCIATION

The "Manual of Waterworks Practice," the preparation of which has occupied so much of the time and effort of members of the association for the past year or two, is now ready for distribution. The book is an attractive volume of 800 pages and can be obtained at the office of the association at 170 Broadway, New York City. The price is $5.00 per copy.

AMERICAN ASSOCIATION OF ENGINEERS

In accordance with the demands of the members of this Association as expressed in a recent referendum, the Board of Directors in September revised the basic structure of the Association, separating national and local dues, and making other changes designed to reduce operating costs and promote a greater degree of local self-government. The directors also eliminated certain grades of members which in its judgment were not suited for a professional organization devoted to engineering welfare work. Three classes of members are now provided for—members and affiliates with dues at $7.50 per annum, and junior members (which includes former student members) at $2.00 per annum.

In order to emphasize the importance of the ethical spirit in the professional practice of engineers "vows of service" will be prepared and suggested for use in graduating exercises at engineering colleges and in the admission of engineers to professional societies.

COUNTY ENGINEERS OF WASHINGTON

The County Engineers of the State of Washington have elected as officers for the coming year L. R. Sampson as president, O. E. Brashears as vice-president and E. A. Middlebrooks as secretary.

CALIFORNIA SECTION, A. W. W. A.

This section announces the following papers for its sixth annual convention: "Service Installation Methods and Standards," by George Read; "Meter Maintenance Methods," by J. H. Fagg; "Jointing Methods for Water Mains," by Clark H. Shaw; "Use of Mechanical Equipment in Trenching, Backfilling and Pipe Laying," by Thomas Brooks; "Design and Construction of Concrete-Lined Reservoirs," by J. E. Flaa; "Design of Balancing Reservoirs and Standpipes for Flat cities," by E. K. Barnum; "Method Used in Moving 36-in. Riveted Steel Water Main," by J. I. Prugh; "Relation of Water Pressures, Service Sizes and Interior Fixtures to Complaints of Inadequate Water Service," by V. E. Perry; "Methods of Protecting Services and Meters During Street Grading and Paving Operations," by P. Diederich.

SAN FRANCISCO DIVISION—AMERICAN SOCIETY OF CIVIL ENGINEERS

The Nominating Committee of this division has submitted its choice of five names for the executive committee, a letter ballot on which will be taken on January 18th. The names selected are as follows: Samuel A. Greeley, Chicago, Ill.; Prof. John H. Gregory, Baltimore, Md.; Prof. Anson Marston, Ames, Iowa; John C. Pritchard, St. Louis, and William L. Stevenson, Harrisburg, Penna.

This section at a meeting on August 18 passed a resolution urging an improvement in the methods of nominating officers for the parent society; also one authorizing the president to appoint a committee to report on the present situation as to testing and inspecting construction materials in San Francisco; also one urging the appointment of F. E. Bonner as executive secretary of the Federal Power Commission to succeed O. C. Merrill.

OHIO CONFERENCE ON WATER PURIFICATION

The program for the 5th annual Ohio conference on water purification which was held under the auspices of the State Department of Health on October 15th and 16th included the following papers and discussions: Raw Water Chlorination Experiments at Ironton, by E. T. Edwards; Research on Gas-Former Resisting Chlorination in Filtered Water at Akron, by C. O. Hostettler and J. S. Gettrust; Electric Type of Precise Turbidimeter for Softened and Filtered Water at Delaware, by LeRoy H. Scott; Progress Reports on Stream Pollution Campaign and on Seal of Safety Campaign by the State Department of Health; Correction of Raw Water pH values by means of Carbon Dioxide, by E. E. Smith; Method of Producing Carbon Dioxide Gas for Water Treatment, by C. P. Hoover; Softening Boiler Feed Water by the Permutit Process, by Clarence Bahlman; Description of Akron Waterworks by J. S. Gettrust; Comparison of B. Coli with Gas-Former Content of Raw and Filtered Water; Descriptions of interesting and novel features of filtration practice by operators in charge of a number of Ohio plants.

SOUTHWEST WATER WORKS ASSOCIATION

Latest advices concerning the exhibit to be held in connection with the convention of this association at Tulsa, Okla., October 12th to 15th gave the following as names of those who had applied for exhibit space: Paradon Engineering Co., Worthington Pump and Machinery Co., A. P. Smith Manufacturing Co., Birch Manufacturing Co., National Meter Co., Mueller Co., Rensellaer Valve Co., McWane Cast Iron Pipe Co., National Water Main Cleaning Co., R. D. Wood &

Co., Eddy Valve Co., Pittsburgh Meter Co., Wallace & Tiernan Co., and Hersey Manufacturing Co.

BOSTON SOCIETY OF CIVIL ENGINEERS

At the meeting of this society October 21st at the Tremont Temple, Harrison P. Eddy and J. R. Freeman will speak on the subject, "The Engineering Board of Review of the Sanitary District of Chicago on the Lake Lowering Controversy and a Program of Remedial Measures." Mr. Eddy will discuss the sewage disposal and water supply problems and Mr. Freeman the water power and navigation conditions and remedial measures recommended. Both of these speakers were members of the Engineering Board of Review.

MASSACHUSETTS HIGHWAY ASSOCIATION

At a meeting to be held in Boston on October 22nd, this association will be addressed by Frank E. Lyman, Associate Commissioner of the Mass. Division of Highways, who has charge of the snow disposal work and will outline what has been done and what will be done in this line of work by the commonwealth authorities.

ASPHALT PAVING CONFERENCE

The fourth annual Asphalt Paving Conference will be held at the Book-Cadillac Hotel, Detroit, Mich., on October 21st to 23rd, under the auspices of the Asphalt Association. Among the papers to be presented are the following; Detroit's Extensive Paving Program, by John W. Reid, director of public works, Detroit; Progress of Road Improvement in Ontario, by S. L. Squire, Deputy Minister of Highways, Ontario, Canada; Denver's Black Base Paving Program, by A. K. Vickery, city engineer; Results of Black Base Construction in Pittsburgh, by J. D. Strain, superintendent of Asphalt Division, Bureau of Highways and Sewers; Salvaging Gravel Roads by Asphalt Surfaces, by G. C. Dillman, chief engineer, Michigan State Highway Department; Resurfacing Gravel Roads with Asphalt Wearing Course, by C. A. Paige, city engineer of Grand Rapids; Surface Treatment of Gravel Roads with Asphaltic Oils, by J. T. Bullen, parish engineer, Shreveport, La.; Asphalt Paving Plant Management, by W. J. Emmons, U. S. Bureau of Public Roads; Researches on Asphalt Paving Mixtures, by Prevost Hubbard, chemical engineer with the Asphalt Association; Relation of Petroleum Industry to Asphalt Paving, by T. W. White, vice-president of Sinclair Refining Co.; Service History and Maintenance Costs and Methods, by R. H. Simpson, city engineer of Columbus, Ohio; Methods and Appliances for Maintaining Asphalt Highways in Small Towns and Rural Sections, by Hugh W. Skidmor, president, Chicago Paving Laboratory; Asphalt Macadam Construction and Maintenance in New York and New England, by V. L. Ostrander, of the Asphalt Association; Resurfacing Old Macadam with Asphalt Macadam Pavements, by D. C. Harvey, city engineer of Rockford, Ill.; Varied and Effective Use of Asphalt in Construction and Maintenance, by W. H. Woodward, superintendent of asphalt paving of Springfield, Mass.; Comparison of Various Foundations for Asphalt Pavements, by George C. Warren, Boston.

The Asphalt Association announces that at this conference it will consider establishment of six or seven temporary engineering schools in various parts of the country for training asphalt paving experts, plans for which will be laid before the convention by J. E. Pennybacker, general manager of the association. It is proposed to include laboratory instruction in conducting tests of paving asphalt, plant inspection, operation of equipment and lectures by the country's foremost asphalt chemists and engineers. These schools would be scattered throughout the country, that in the South Atlantic section being located at Raleigh, N. C., Columbia, S. C. or Atlanta, Ga.; that in the East Atlantic section at either Washington, D. C., Richmond, Va., or Baltimore, Md.; and that in the North Atlantic at either New York, Boston, Providence or in New Haven. It is proposed to form a faculty from among the formost authorities on asphalt paving, who will lecture at the several schools in succession, the course at each school lasting one or two weeks.

NEW ENGLAND WATERWORKS ASSOCIATION

The forty-fourth convention of the N. E. W. W. A., held on board the steamer "Richelieu," Sept. 8th to 11th, was attended by 88 active members, 66 associate members and 103 guests, mostly women and children. This attendance was much smaller than usual and apparently indicates that many of the members prefer a convention at which they are not compelled to remain during the entire series of meetings. As one result of the small attendance the authors of only about half of the papers on the program were present to read them. This is partly accounted for by the fact that 8 of the 15 papers on the program were presented by consulting engineeers, and we have noticed that many of these busy men are able generally to be present during only one or two days of the convention and apparently could not devote practically an entire week to the purpose. Those who attended the convention, however, are in general agreement that it was a very enjoyable one.

A count of the ballots for officers for 1925-6 showed that Theodore L. Bristol had been elected president; George A. Carpenter, vice-president; Robert Spurr Weston and J. W. Graham, directors, and Albert L. Sawyer, treasurer. The secretary's report showed a membership August 31 of 751 active members, 87 associate members, 7 honorary and 4 corporate. This was a net loss of 7 for the year. The total receipts was $11,810. The treasurer's report showed that the finances of the society were in excellent condition.

Following a paper by W. Sherman Chase, read by Charles W. Sherman, entitled "The Score System for Grading Water Supplies According to Sanitary Conditions," Mr. Sherman moved that the executive committee be instructed to appoint a committee on scoring the sanitary condition of water supplies, which was voted by the society. The Dexter-Brackett medal, for the best paper presented to the society during the year, was awarded to Robert E. Horton for his paper, entitled, "Determination of Mean Precipitation on a Drainage Area," the committee on the award having been Frank A. Marsden, Thomas H. Wiggin and A. R. Hathaway.

During Monday, September 7th, members were taken on a trip on the St. Lawrence in speed boats or indulged in golf at Alexandria Bay. On Tuesday the party proceeded down the St. Lawrence river, passing through the rapids on the way, except that the river was too low to permit passing the Lachine Rapids, around which they were taken by railway, reaching Montreal at 6:30 P. M., where they at once boarded the steamer "Richelieu," where the convention proper was to be held. The first session was held that evening, opening with the president's address, following which the announcement was made of the award of the Dexter-Brackett medal.

On Wednesday morning Paul Hansen presented a paper entitled "Tastes in the Water Supply of Marquette, Michigan, Due to Phenol Wastes," Mr. Hansen not reading the paper, but showing a number of lantern slides accompanied with descriptive comments. This paper was discussed by Morris Knowles, who stated that the only practical method of disposing of phenol waste waters was to use them for cooling coke. Henry W. Clark's paper, "The Question of Iodine and Water Supplies," was read by Secretary Gifford and was discussed by Robert Spurr Weston. The secretary also read a paper describing "The Filtration Works of the City of Montreal," by Frederick E. Field, who was not present. The afternoon was spent in visiting Murray Bay, which the steamer had reached in the meantime.

In the evening the "Lawrence Water Supply, Investigation and Construction," illustrated by lantern slides, was presented by Morris Knowles and Myron G. Mansfield, consulting engineers, and Patrick Nugent, superintendent of waterworks. The paper described the waterworks very thoroughly but was not read by Mr. Knowles, who instead gave a description of the work in the form of comments on the lantern slides. It was discussed by J. F. Laboon, P. Nugent, E. G. Bradbury and others. James W. Armstrong then described some features of filter design, dealing quite thoroughly with several details of the new filter plant constructed at Baltimore. Features receiving special attention were the mixing basins, pipe gallery, filter bottoms and filter sand, and the use of concrete

in constructing such plants. He believed that the pipe gallery at Baltimore, being more spacious and lighter than any other with which he was acquainted, would receive more attention by the operators. The filter bottoms were of slats rather than strainers, Mr. Armstrong believing that there is no value whatever in a strainer system. He believed that filter sand should be practicaly the same size from top to bottom, great pains being taken to determine what size of sand would give the best results with the water to be treated. The paper was discussed by J. F. Laboon, E. G. Bradbury, Morris Knowles, Paul Hansen and others.

The program for Thursday morning contained a paper by Leonard Metcalf, Harry A. Fuller and Charles B. Mitchell entitled "The New Sebago Lake Intake of the Portland Water District," and one by Frank Barbour entitled "The New Little Quittacas Intake in New Bedford, Mass," but as none of the authors were present the reading was postponed until a later meeting in Boston. A paper on grading water supplies, by Mr. Chase, referred to above, was read by Mr. Sherman and discussed by Beekman C. Little, J. F. Jackson, Mr. Weston and M. N. Baker. J. A. Tremblay read a paper describing the Waterworks of Quebec City, from the first installation in 1853. In the afternoon members visited the town of Tadousac, where the steamer spent the entire day. On Thursday evening Colonel F. F. Longley's paper, entitled "The Coolgardie Pipe Line in Australia and Measures Taken to Correct Corrosion," was read by his brother, J. E. Longley, and was illustrated by lantern slides. This discussed at length data presented some years ago by British engineers and supplemented by later information showing the reduction in carrying capacity of a conduit due to corrosion and the effect of de-aeration of water by lime treatment. In a written discussion of this F. N. Speller expressed the opinion that steel pipe should not be used in corrosive soils and that tar coating should not be used with it. J. F. Laboon then read a paper entitled "Features of the Wheeling, W. Va., Water Works Design and Operating Results," illustrated by lantern slides, which was discussed by Morris Knowles and Paul Hansen.

On Friday morning, the steamer having reached Quebec, the party was taken in motor busses to visit the waterworks of the city, and in the afternoon visited the shrine of St. Anne de Beaupre and the Falls of Montmorency, after which the steamer sailed for Montreal.

The final business session was held on Friday evening, when Caleb M. Saville read a paper entitled "Financing Main Pipe Extension by the Assessment Method," which was discussed by a number of members, including Messrs. Knowles, Bradbury, Taylor, Hansen and Hawley. Although Mr. Saville stated that the assessment method described had worked well in Hartford, some of the members questioned whether it would be as successful in other cities, and especially under other state laws. R. G. Tyler then read a paper discussing "Fineness Modulus for Filtration Sands," which was discussed by Mr. Hansen.

AMERICAN SOCIETY FOR MUNICIPAL IMPROVEMENTS

The Thirty-First Annual Convention of this society will be held at Hotel Ft. Des Moines, Des Moines, Ia., on October 26 to 29. The program prepared is as follows:

Monday, October 26, 1925

Morning

9:00 A. M.—Registration will begin and continue throughout the convention.

12:00 M.—Meeting of Executive Committee.

Monday Afternoon

1:00 P. M.—Golf Tournament. Arrangements will be announced at the registration desk.

2:00 P. M. to 4 P. M.—Meetings of Committees on Specifications as follows: 2:00, Brick Pavements, George F. Fisk, Chairman; Subgrades and Foundations, H. E. Breed, Chairman; Stone Block Pavements, Thomas E. Collins, Chairman; Municipal Contract Forms, W. W. Horner, Chairman. 2:30—Cement Concrete Pavements, E. E. Butterfield, Chairman; Sewers, F. R. Allen, Chairman; Sidewalks and Curbs, W. H. Wise, Chairman. 3:00—Street Railway Pavements and Track Construction, E. A. Kemmler, Chairman; Wood Block Pavements, Ellis R. Dutton, Chairman; Bituminous Pavements, E. A. Kingsley, Chairman.

Monday Evening

8:00 P. M.—Formal Opening of the Convention; Addresses of Welcome by Mayor and others and responses. President's Address by E. L. Dalton, consulting engineer, Dallas, Tex; report of Executive Committee; report of Secretary, Charles Carroll Brown, city engineer, Lakeland, Florida; report of Treasurer, P. L. Brockway, city engineer, Wichita, Kansas; report of Finance Committee, W. A. Hansell, Jr., Chairman, superintendent of construction, Atlanta, Georgia; Selection of Committees on Nominations and Resolutions; introduction of proposed amendments to the constitution and other new business; the sesquicentennial international exposition at Philadelphia.

An informal reception will follow this program with some specially attractive features.

Tuesday, October 27, 1925

Morning and Afternoon

Report of Committee on Street Paving and Street Design, R. Keith Compton, Chairman, superintendent of public works, Richmond, Virginia.

Developments in the Theory and Practice of the Design and Construction of Bituminous Pavements, by Hugh W. Skidmore, president Chicago Testing Laboratories, Chicago, Illinois.

Behavior of Bituminous Pavements Under Service Conditions, by R. Keith Compton, director of public works, Richmond, Virginia.

Test for Stability of Sheet Asphalt Paving Mixtures, by Prevost Hubbard, chemical engineer, and F. C. Field, chemist, The Asphalt Association, New York City.

Behavior of Concrete Pavements Under Service Conditions, by H. Eltinge Breed, consulting highway engineer, New York City.

Theory of the Design of Concrete Pavements, by Clifford Older, consulting engineer, Chicago, Illinois.

Abrasion Test for Concrete, by P. L. Brockway, city engineer, Wichita, Kansas.

Report of Committee on Street Maintenance, Street Cleaning and Snow Removal.

Repair Costs of City Pavements (Asphalt and Brick), by R. H. Simpson, chief engineer, Division of Engineering and Construction, Department of Public Service, Columbus, Ohio.

Experimental Pavements in the Boro of Queens and Observations of Current Paving Practice, by E. E. Butterfield, in charge of laboratories, Office of the President of the Boro of Queens, New York City, Long Island City, New York.

Three-Lane Two-Way Roadways, by A. H. Blanchard, Professor of Highway Engineering and Highway Transport, University of Michigan, Ann Arbor, Michigan.

Associate Members Program

Finishing Machines on Construction of Concrete City Streets, by Lion Gardiner, vice-president The Lakewood Engineering Company, Cleveland, Ohio. (Illustrated).

The Salvage Value of Brick Pavements, by A. S. Mirick, district engineer of the Eastern Paving Brick Manufacturers' Association, Pittsburgh, Pennsylvania.

Use of Brick Less Than Three Inches in Depth, by E. E. Duff, secretary National Paving Brick Manufacturers' Association, Cleveland, Ohio.

The Irresponsible Bidder, by Ralph L. Warren, secretary Warren Brothers Company, Boston, Massachusetts.

Surety Bonds, by George L. Warren, chairman of the Board, Warren Brothers Company, Boston, Massachusetts.

Ladies' program includes shopping tour in the morning and visit to State Capitol and Historical Building in the afternoon.

Tuesday Evening

Banquet for members and guests ($2 each) with special entertainment program not to be given in advance.

Wednesday, October 28, 1925

Morning

Report of Committee on City Planning, E. A. Fisher, Chairman, Rochester, New York, being a report on what has been done toward carrying out the city plan for St. Louis by Harland Bartholomew.

The City Plan and Community Consciousness, by James B. Weaver, member of Town Planning Commission, Des Moines, Iowa.

The Plan of Chicago, by Eugene S. Taylor, manager, Chicago Plan Commission, Chicago, Illinois.

Zoning and the City Plan, by Har-

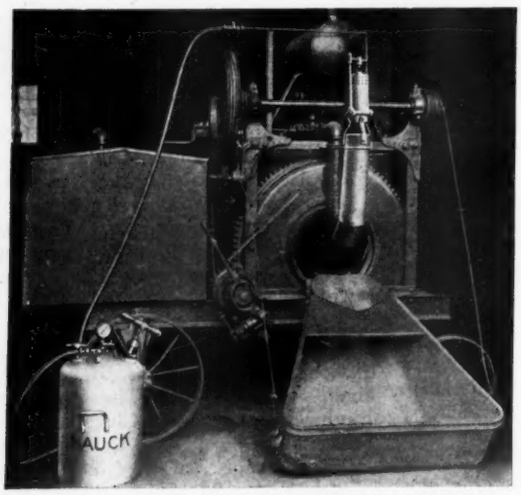
(Continued on page 46)

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

HEATERS FOR CONCRETE MIXERS

The Hauck Manufacturing Co., of Brooklyn, New York, has adapted its heater for use with various makes of concrete mixers to permit heating the aggregate in mixers during cold weather. The company claims that with one of its heaters, the temperature of the concrete can be raised to 90 degrees Fahrenheit or as high as desired. The heater burns kerosene and directs the heat into the mixing drum while mixing is taking place. As compressed air is not usually available on the job, the hand pump type is ordinarily used. A few minutes use of the hand pump will operate the burner for three hours with forty to sixty pounds pressure.



HAUCK HEATER ATTACHED TO MIXER

THORNHILL DUMP WAGON

The Thornhill Wagon Company, of Lynchburg, Va., manufactures a rotary skein dump wagon for which it claims that the rotary bearings make it by far the lightest running dump wagon. The wood used in the construction is the highest grade of oak and hickory thoroughly seasoned. Channels on the sides brace and stiffen the whole bed and prevent any bulging of the sides. The front wheels are 36 in. high on a 2 1/4 in. steel axle and the rear wheels 58 in. high on a 2½ in. steel axle.

BEAVER POWER DRIVE

The Borden Company of Warren, Ohio, manufactures a power drive for cutting and threading metal pipe by the use of ordinary hand tools. This it does by revolving the pipe while the tools stand still. It is run by an electric motor which can be operated from an ordinary lamp socket, and is portable and simple. The pipe is placed in the chuck as in a vise. Pipes from ¼" to 2" inclusive can be worked.

It is regularly equipped with a one-half horsepower, heavy duty, 110-220 volt A. C., 60 cycle, single phase motor; or a motor for a different current can be obtained if ordered.

ERSTED HYSTER

The Ersted Machinery Manufacturing Co., of Portland, Ore., manufactures what it calls a "Hyster," which consists of hoisting drums attached to and operated by a Fordson tractor. They are made either single-drum or double-drum. The frames are of cast steel, rigidly interconnected by tie bars. The drum of the single-drum, or the main drum of the double-drum hoist has a barrel diameter of 6 inches and flange diameter of 18 inches, with a length of 12⅝ inches between flanges and a cable capacity of 950 feet of one-half inch cable. The second drum has a flange diameter of 15½ inches and carries 650 feet of cable. Clutches are the standard cone type hoisting engine clutch with asbestos friction lining. Hysters are chain driven from the Fordson power take-off. Adjustable brace rods provide means for quickly taking up any slack of chain due to wear. The Hyster is attached to the Fordson tractor by means of reinforced channel iron members, which are bolted rigidly to the ends of the Hyster radiator bottom tank (which replaces the Fordson tank) and to machined steel brackets which are bolted to the flange of the Fordson transmission housing.

The Hyster is operated and fully controlled from the driver's seat. It has been designed so that the hoisting cable may lead off at practically any angle without interference. It is guaranteed for a maximum hoisting capacity or direct line pull of 5000 pounds off the barrel of the main drum or 4000 pounds from the smaller drum, and for speeds of from 10 to 500 feet per minute. For dragline scraper operation or other haulback work, the upper drum may be lagged to give line speeds two to three times as fast as the main line speed.

ERSTED HYSTER BACKFILLING WIDE TRENCH

REDFLEX SIGNALS

The Automatic Signal and Sign Company, of Canton, Ohio, manufactures warning signals, the effective part of which consists of a lens made up of special heavy laminated pot colored glass, which is hermetically sealed in a weather-proof case of cast aluminum and protected by a strong galvanized expanded metal screen. This is supported on a post of galvanized steel. The post also carries a sign of cast aluminum, the letters and background being cast in one piece, the letters raised ⅛ inch and enameled black. The red lens is clearly visible by day and reflects red at night from the glare of automobile headlights.

HEATING KETTLES

The Renton Supply Company, of Boston, Mass., manufactures an oil-burning jacketed heating kettle which it claims has heated the heaviest asphalt to workable temperature within twenty minutes after the oil burner was started. There are no tubes, but there are eight distinct heating surfaces and a three-inch air space around the kettle. The vaporized flame is directed through the center and circulates around the eight surfaces. No direct heat is applied to the bottom of the kettle to cause it to burn out. It consumes a little less than one gallon of oil per hour in the 150 gallon kettle. It is made in three sizes—150 gallons capacity, 300 gallons and 500 gallons.

SEAVERNS BATCH HOPPERS

The James B. Seaverns Company of Chicago, has recently placed on the market a new batch hopper designed for road builders and building contractors, a feature of which is its wide range of

Without Cast Iron Pipe there is not Complete Fire Protection

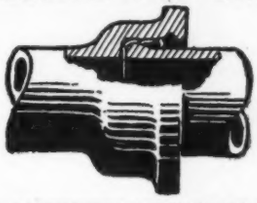
Immediately adjacent to the ruins shown above, was the hydrant shown to the right. The hydrant was in excellent mechanical condition, and was properly located for protecting the building illustrated. In addition to this, the fire department functioned properly. *But*—the pipe furnishing the water to the hydrant was not Cast Iron, and it failed when most needed.

The property damage in this one fire would have more than paid the difference in cost between the cheaper substitute and Bell and Spigot Cast Iron Pipe.

THE CAST IRON PIPE PUBLICITY BUREAU, Peoples Gas Building, Chicago

CAST IRON PIPE

THE BELL & SPIGOT JOINT



THE ACCEPTED STANDARD FOR UNDERGROUND CONSTRUCTION

Our new booklet, "Planning a Waterworks System," which covers the problem of water for the small town, will be sent on request

Send for booklet, "Cast Iron Pipe for Industrial Service," showing interesting installations to meet special problems

volume. Model No. 24 can be reduced to 9 cubic feet, or expanded to 25 cubic feet, by raising or lowering the lower section, which is made adjustable by four screws. The hopper is equipped with a roller strike-off gate immediately above the hood, which is handled very conveniently by the operator on the ground. The trip door in the lower section is locked and tripped by means of a lever, which also is within convenient reach of the operator.

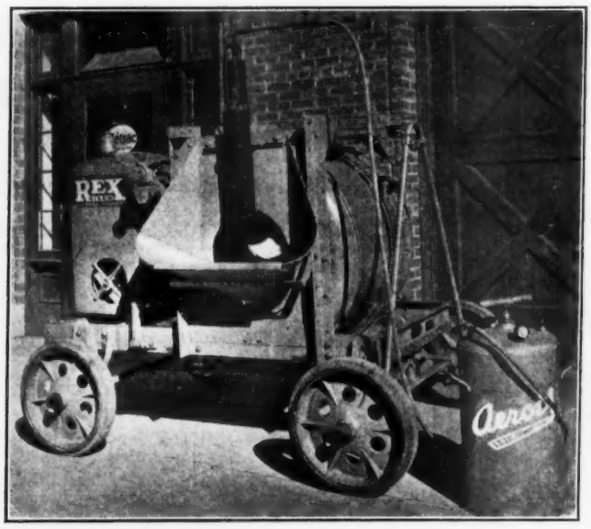
RED BRASS PIPE

The American Brass Pipe Company, of Waterbury, Conn., not only furnishes ordinary brass pipe but has recently developed what it calls Anaconda red-brass pipe, which will not clog, rust or deteriorate in strength when carrying water or surrounded by soil which is unusually corrosive. Red brass fittings are furnished for use with this pipe. After an investigation of corrosive resisting properties of various proportions of copper and zinc, the company found that brass containing 80 to 85 percent copper lost less weight when subjected to highly polluted water than pure copper or any other copper alloys, and brass with this composition is that furnished under the above name.

The pipe will stand bending and stretching without cracking. The cost is but little more than that of the regular brass pipe, while the cost above that of iron or steel is more than balanced by the increased durability and satisfactoriness.

AEROIL CONCRETE HEATERS

The Aeroil Burner Co., Inc., of Union Hill, N. J., furnishes a concrete heater that can be attached easily to almost any non-tilting drum-type concrete mixer on the market. The heater delivers the heat into the mixer drum and produces concrete with a temperature of 70 to 90 degrees in zero weather, which it claims will remain warm for 48 to 56 hours after it has been poured. The outfit consists of a pressure tank of either 15 gallons or 20 gallons capacity, with a 12 foot length of oil hose, kerosene burner and flame distributor and clamps for fastening it to the mixer. The smaller burner consumes approximately 2 gallons of oil per hour and the larger one 2 1/2 gallons.



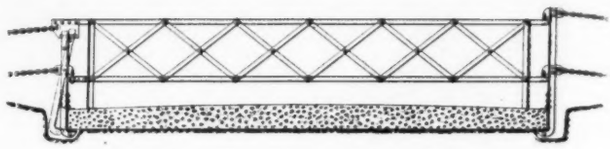
HEATING CONCRETE DURING MIXING

ONE-MAN BAG FOR HANDLING MATERIALS

The L. H. Gilmer Co., of Philadelphia, is placing on the market a bag of webbing and canvas which is stiff enough to stand alone and remain open while being loaded, and is strong enough to permit of its being dragged over rough ground when filled with rock or other heavy objects. At the same time it is collapsible and permits compact storage. The bag was devised for handling track ballast and has been thoroughly tested. The fact that the bag stands upright and open makes it possible to load it without the assistance of a helper to hold it open, and it is sufficiently rigid to permit of transporting filled bags on trucks without spilling the contents.

ONE-MAN BAG

The bottom of the bag is of heavy, closely woven 2-ply cotton belting, with no seams, joints or rough spots on the outside; while the side is of heavy canvas and the junction of side and bottom is protected by a strip of belting stock, and another piece of the same material is fastened around the top to protect it and to hold the bag open. There are two handles at the top and two at the bottom.


STEEL ROD BARRICADE

STEEL ROAD BARRICADE

The Blaw-Knox Company of Pittsburgh has just placed on the market a steel road barricade which was invented by R. A. Trufant, a highway engineer in the state of Illinois. It is a lattice steel fence supported by steel posts attached to the edges of the pavement and can be removed only by a person holding the key. It is made from riveted steel shapes. The weight of a gate and standards for a 20-foot road is 430 pounds. Side chains can be used to prevent passing around the ends of the barricade if desired, but are not part of the standard equipment.

ELECTRIC ARC WELDED PIPE

The Beall Pipe and Tank Corp., formerly the Coast Culvert and Flume Company, of Portland, Ore., has developed the manufacture of electric arc welded pipe made from either steel or iron for municipal water systems. Considerable time and money was spent in developing automatic welding equipment for the economical manufacture of such pipe and in experimenting to perfect the method of manufacturing the best possible pipe. The company is now engaged in manufacturing several miles of 30-inch pipe for Eugene, Oregon and 8-inch pipe for Sutherlin. The pipe is made in all diameters from 8 to 72 inches, and of all thicknesses from 14 gauge up to one-half inch. The pipe is coated with "pioneer mineral rubber," except that for alkali or acid soils it is spirally wrapped with paper partly composed of tar with a mica coated surface.

SPOTLIGHT FOR TRAFFIC OFFICERS

The Westinghouse Electric & Manufacturing Company manufactures a high intensity spotlight for illuminating traffic officers standing at street intersections, arranged for mounting directly above the officer's station so as to illuminate intensely the officer himself and the area immediately around him. The unit is composed of a porcelain head, with a 1¼-inch canopy, and is equipped with a socket for either series or multiple connection. A parabolic reflector is supported by means of a cast iron skirt attached to the porcelain head. A hinged cover with wire glass lens closes the bottom of the unit, making it completely weather and dust proof.

ALUMINUM GRAPHITE PAINT

The Joseph Dixon Crucible Co., of Jersey City, N. J., has added to its line

Check them Off ✓

ONE BY ONE

The Whole Length of Chicago's Down Town Water Front

ALL YEOMANS EQUIPPED

with SHONE EJECTORS, YEOMANS EJECTORS or BILGE PUMPS

Blackstone Hotel	Orchestra Hall	People's Trust Bldg.
Congress Hotel	Pullman Bldg.	Public Library
Auditorium Hotel	Art Institute	Crerar Library
Fine Arts Bldg.	Peoples Gas Bldg.	Federal Life Bldg.
McCormick Bldg.	Ill. Athletic Club	London Guar. Bldg.
Straus Bldg.	Monroe Bldg.	Wrigley Bldg.
Railway Exchange	University Club	Wrigley Annex
Lake View Bldg.	Chicago Athletic Club	Tribune Tower

Important public buildings all over the world are protected with YEOMANS APPARATUS, proven dependable under all conditions.

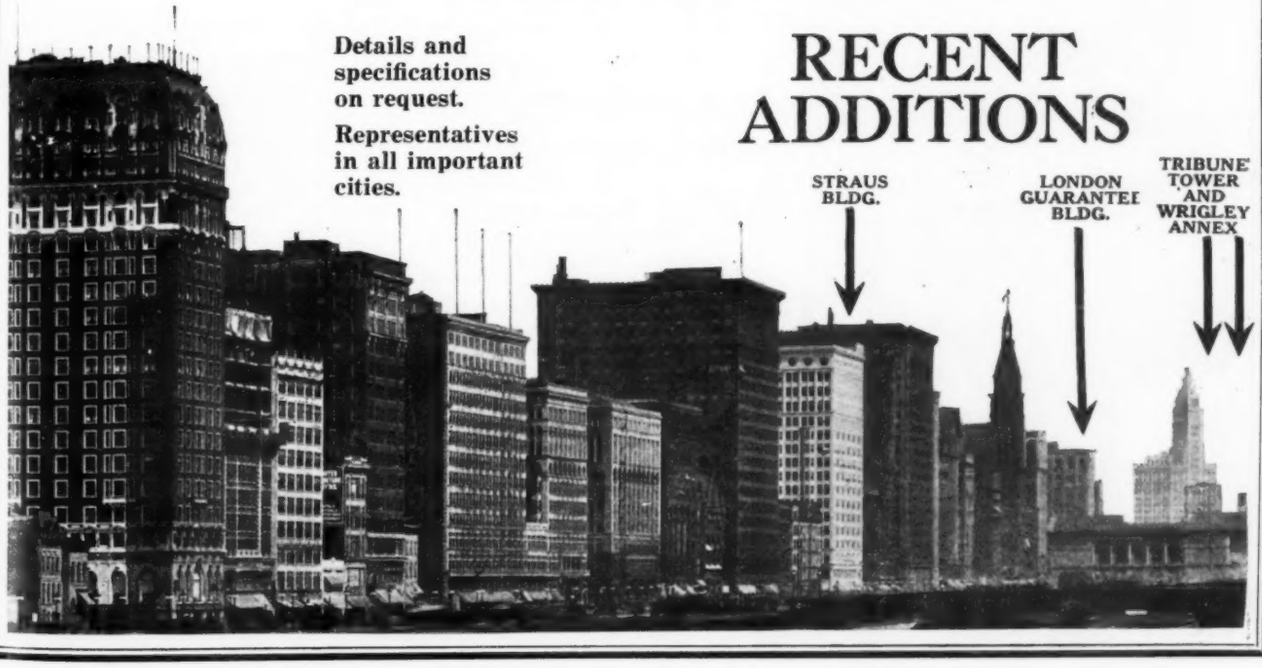
YEOMANS BROTHERS COMPANY

1419 DAYTON STREET, CHICAGO

Details and specifications on request.

Representatives in all important cities.

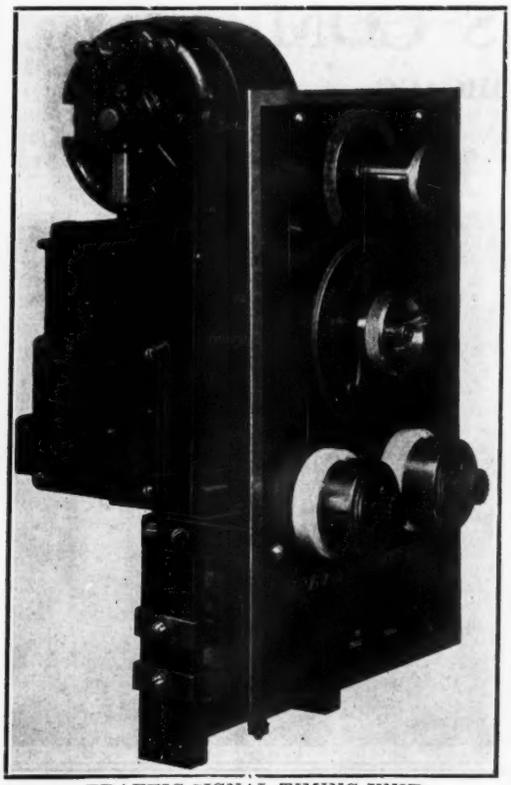
RECENT ADDITIONS



of paints, an aluminum graphite paint to meet special requirements of gas and oil companies, pipe lines, municipalities, and wherever an aluminum or light colored paint is required. It is recommended for all exposed metal work. It is composed of aluminum combined with flake silica-graphite pigment and boiled linseed oil. The luster is slightly less than a straight aluminum paint, but is pleasing to the eye, and the paint is claimed to be as durable as Dixon's red lead graphite primer or silica graphite paint. Gasses, acids, smoke and other deteriorating agents have little effect on the paint. It reflects light and heat and therefore will keep the temperature of oil or water in tanks 10 degrees lower than if the tank were painted with a dark paint. If placed over a coat of dark paint, one coat is sufficient.

TRAFFIC SIGNAL CONTROL

Ives & Stern, of Chicago, manufactures the Ives-Stern traffic signal timer, designed specifically for traffic signals and permitting any desired timing without stopping the operation and adaptable to any signal and any condition. The switches, manual control and other parts are all mounted on a brass etched instrument panel and protected by hinged weather-proof cover with a wiring diagram on the inside of it. The entire instrument is housed in either sheet metal or cast metal housing mounted on a cast iron post. The snap switch principle with exceedingly heavy contacts makes it possible for the timer to carry 10,000 to 20,000 watts per contact, which is more than enough to light the largest synchronized signal system. The timing can be adjusted to the exact proportion necessary to meet the local condition, and can be adjusted in a minute without disturbing the operation of the machine. The cycle of time is divided by adjusting the angular relation between the two arrows on the large dial in the center of the panel. This large dial during operations revolves slowly in a clock-wise direction and makes one revolution for each cycle, the timer changing the flow of traffic every time an arrow passed the index mark at the top of the dial. Adjusting one arrow relative to the other divides the flow of traffic between the two directions proportionately, while the speed of the dial determines the length of the cycle. Three speeds are regularly furnished—50, 60 and 70 seconds each; but as many as 8 speeds can be installed by special order. Speed regulation is claimed to be accurate within 2 percent.



TRAFFIC SIGNAL TIMING UNIT

INDUSTRIAL NOTES

READING BOILER PERSONNEL

The Reading Iron Company of Reading, Pa., has appointed G. H. Woodroffe metallurgical engineer of its boiler tube department, a newly created position. Mr. Woodroffe was nine years with the Baldwin Locomotive Works and eight years with the Parkesburg Iron Company.

LINDE AIR PRODUCTS COMPANY

The Linde Air Products Company, of New York City, announces that its district sales office at Seattle is now located at 421 Railway Exchange Building, 619 Second Avenue, with O. H. Davenport as district sales manager.

A. W. FRENCH COMPANY REPRESENTATIVE

The firm of A. W. French & Company is now represented in New York by the R. E. Brooks Company, 50 Church St.

U. S. MOTOR TRUCK CO.

The United States Motor Truck Company of Cincinnati has announced the appointment of L. A. Poundstone as Eastern Division Sales Manager for the District of western New York, western Pennsylvania and part of West Virginia; of Bert E. Handel as Division Sales Manager for Illinois and Indiana; of C. H. Gierhart as Division Sales Manager for part of West Virginia, southern Ohio and eastern Kentucky. Andrew Graf, formerly Assistant Chief Engineer has been appointed Chief Engineer, succeeding E. C. Shumard.

PARADON'S MINNEAPOLIS REPRESENTATIVE

The Paradon Engineering Co., of Long Island City, N. Y., has appointed as its representative in Minnesota and North and South Dakota E. L. Sandberg, with his office at 1118 Metropolitan Life Bldg., Minneapolis.

J. T. TRACTOR AGENCIES

The J. T. Tractor Co., of Cleveland, O., anounces as new agencies for its tractors: W. J. Armstrong Supply Co., Sault Ste. Marie, Mich.; Bangor Mill Supply Co., Bangor, Me.; Alan G. Cary & Co., 432 Endicott Bldg., St. Paul, Minn.; and Joe Lyons Machinery Co., 112 N. Louisiana St., Little Rock, Ark.

OHIO VALLEY ROCK ASPHALT CO.

This company, of Cincinnati, O., announces that Perry T. Ford, formerly associated with its Ohio representative, A. R. Taylor, has been made sales manager. The address of the general sales office has been changed from 910-914 Schmidt Bldg., Cincinnati, to 517-518 Starks Bldg., Louisville, Ky.

CHAUSSE OIL BURNER DISTRIBUTORS

The Chausse Oil Burner Co., of Elkhart, Ind., announces the appointment of the following sales distributors: W. B. Spencer, New York City; Bakstad Machinery Co., Chicago, Ill.; Standard Power & Equipment Co., Birmingham, Ala.; J. W. Bartholow Co., Dallas, Tex.; Interstate Machinery & Supply Co., Omaha, Neb.; Minneapolis Equip. Co., Minneapolis, Minn.; H. W. Moore Equipment Co., Denver, Col.; F. C. Stannard Machinery Co., Salt Lake City, Utah; Stuart S. Smith Machinery Co., San Francisco, Cal.; Brown, Bevis & Co., Los Angeles, Cal.; Willamette Equipment Co., Portland, Ore.; National Machinery & Equipment Co., Seattle, Wash.; Brown, Fraser Co., Vancouver, B. C.; H. I. Skilton, Havana, Cuba.

MUELLER CO. PICNIC

From September 14 to 19 the entire sales force of the Mueller Co. was in session at Mueller Lodge, the mornings devoted to business and the afternoons to business. The week culminated in the picnic which the company gives annually to its employees and their families.

U. S. MOTOR TRUCK CO.

This company, of Cincinnati, O., announces that H. G. La Forge has been appointed division sales manager for the state of Indiana.

STOCKLAND ROAD MACHINERY AGENCY

The Stockland Road Machinery Co. announces the appointment of the Illinois Equipment Co. as its agent for central Illinois. That company's headquarters are at Bloomington and it maintains branch sales offices at Springfield, Decatur and Danvile.

STERLING ENGINES AT THE SHOW

The Sterling Engine Co., of Buffalo, N. Y., will exhibit at the Power Show, in Grand Central Palace Nov. 30 to Dec. 5, a high-duty gasoline engine rated 225 h.p. at 1,200 revolutions, the company's latest development for driving pumps or electric generators.

Cast Iron Pipe Resists Earthquake

"By 10 o'clock on the morning of the quake all mains were repaired or bypassed,—"

ENGINEERING NEWS-RECORD,
July 9, 1925.

THE recent disastrous earthquake in Santa Barbara resulted in property damage of more than ten million dollars. However, they were spared the horrors of a serious conflagration following the quake. The cast iron water mains were practically unharmed and small fires were extinguished before they could spread. Cast iron pipe played its part in preventing more serious losses.

The remarkable resistance of this material to strains set up by the shifting earth is shown by the fact that there were only two breaks in the one hundred twenty-four miles of cast iron pipe in use in that city. The ease with which bell and spigot pipe can be handled resulted in repairs in a very few hours.

INSTALL U. S. CAST IRON PIPE AND BUILD FOR PERMANENCE

United States Cast Iron Pipe and Foundry Co.

GENERAL OFFICE: BURLINGTON, NEW JERSEY

SALES OFFICES:

Philadelphia—1421 Chestnut Street
New York—71 Broadway
Pittsburgh—Henry W. Oliver Bldg.
Dallas, Texas—Magnolia Bldg.

Chicago—122 South Michigan Boulevard
Cleveland, Ohio—1150 E. 26th St., N. E.
Birmingham, Ala.—1711 American Trust Bldg.

San Francisco—Monadnock Building
Minneapolis—Plymouth Building
Buffalo—957 E. Ferry St.
Kansas City—Interstate Bldg.

NEW CATALOGS

GRANITE IN STREET CONSTRUCTION

A 32-page book, well bound with cardboard, has just been issued by the Granite Paving Block Manufacturers' Association, 31 State Street, Boston, Mass. It contains a comprehensive description of the kind of stone from which granite paving blocks should be made; the method of quarrying and cutting; the standard sizes; abrasion tests; construction methods including base, cushion and joint fillers. Eight pages refer to granite curbing.

Copies will be mailed free upon request to those interested. Every engineer interested in paving should have a copy.

DURAX PAVEMENT

The Collins Durax Company, of Salisbury, N. C., has issued a fourteen-page pamphlet describing Durax pavement, supplemented with thirteen pages of letters from officials of cities where it has been laid and others. Ful specifications for the material and the laying are given.

HARNISCHFEGER BULLETINS

The Harnischfeger Corporation, of Milwaukee, Wis., has recently issued in Spanish and Portuguese bulletins describing the construction and operation of their gasoline, Diesel and electric shovels, draglines, clamshells, pile drivers, trenchers, and other appliances, for distribution in countries where Spanish or Portuguese is spoken.

CLAP PRODUCTS STANDARDS

The Clay Products Association, of Chicago, Ill., has issued "Tentative Standards" for vitrified sewer pipe, flue linings and other vitrified clay products, giving those of the American Society for Testing Materials in most cases. Illustration and dimensions and weight of each size are given.

DIAMOND DRILL CATALOGUE

The Sullivan Machinery Co., of Chicago, Ill., has issued a new catalogue describing and illustrating its latest improved types of diamond drills, which it has manufactured for fifty years. It includes drills for engineers' test borings. Instructions are given for selecting an outfit and for setting up and operating the machine.

CONCRETE PAMPHLETS

The Portland Cement Association offers for distribution a number of pamphlets dealing with the use of cement concrete, some of the titles being "Concrete Pipe Sewers," "Concrete Tanks for Industrial Purposes," "Facts about Concrete Roads," and "Concrete Highway Bridges," the last being the most recent publication.

STEEL RODS FOR WELDING

The Chicago Steel & Wire Co., of Chicago, Ill., has just issued a booklet of 28 pages entitled "Properties of Steel Filler Rods for Gas and Electric Welding," which is a treatise on the subject, a large part of which is new material developed by the investigations of the company.

SHOVEL-CRANE-DRAGLINE

The Koehring Company, of Milwaukee, Wis., has just issued "Detailed Specifications" of its "Size No. 1 Shovel-Crane-Dragline," a 32-page catalogue, abundantly illustrated, describing fully this new, powerful, combination equipment for handling earth and other materials under all conditions.

CENTRIFUGAL PUMPS

The De Laval Steam Turbine Co., of Trenton, N. J., has published with the above title a profusely illustrated 72-page book discussing the design and applications of centrifugal pumps, single and multiple stage, for water works, drainage, hydraulic pressure and other services.

PROTECTIVE PAINTS FOR TANKS

Hill, Hubbell & Co., of San Francisco, has just published a discussion of the subject of "Modern Practice in Tank Protection," giving the results of its experience as manufacturers of technical paints for protecting steel, iron and concrete tanks.

CLAMPS FOR CONCRETE FORMS

The M. & M. Wire Clamp Co., of Minneapolis, Minn., in a pamphlet entitled "A Guaranteed Way of Saving Labor and Material on Concrete Forms," describes, largely by photographs, the various applications of M. & M. Clamps to forms for concrete walls and columns.

AUTOMATIC TRAFFIC COP

The Klug & Smith Co., of Milwaukee, Wis., has published a catalogue of its various types of traffic signals with the title, "Safe, Economical Traffic Regulation." Twenty-eight pages with illustrations in four colors.

TANK LEVEL CONTROLLERS

Edward E. Johnson, Inc., of St. Paul, Minn., publishes with this title a catalogue of controllers designed to maintain within close limits any desired water level in elevated tanks, using an entirely new principle of operation.

PORTABLE AIR COMPRESSORS

The Sullivan Machinery Co., of Chicago, has recently published Bulletin No. 77 N, describing its portable air compressors W K 312, 314, 32 and 34. Descriptions and illustrations of machines are given.

STEEL ROAD FORMS

The Heltzel Steel Form & Iron Co., of Warren, O., has published, under the title "Proof," a bulletin giving information obtained through a questionnaire, to which more than 100 engineers and contractors replied, dealing with the use of forms for constructing road and street pavements, sidewalks, curbs, etc.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, etc., required by the Act of Congress of August 24, 1912, of Public Works, published monthly at New York, N. Y., for October 1st, 1925.

State of New York, County of New York, ss.: Before me, a Notary Public in and for the State and county aforesaid, personally appeared James T. Morris, who, having been duly sworn according to law, deposes and says that he is the business manager of Public Works, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and, if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business editor and business manager, are:

Publisher—Public Works Journal Corporation, 243 West 39th Street, New York, N. Y.
Editor—A. Prescott Folwell, Montclair, N. J.
Managing Editor—A. Prescott Folwell, Montclair, N. J.
Business Manager—James T. Morris, White Plains, N. Y.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent. or more of the total of stock.)

Public Works Journal Corporation, 243 West 39th Street, New York, N. Y.
Sumner W. Hume, 243 West 39th Street, New York, N. Y.
James T. Morris, White Plains, N. Y.
A. Prescott Folwell, Montclair, N. J.
Contracting Pub. Co., New York, N. Y.
Stockholders of Contracting Publishing Co.:
H. F. Pomeroy, 33 W. 42nd St., New York, N. Y
J. R. Breuchaud, 342 Madison Ave., N. Y. City.
Frank W. Skinner, 20 Vesey Street, N. Y. City.
H. F. Hackerdorn, Consumers Bldg., Chicago, Ill.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent. or more of total amount of bonds, mortgages, or other securities are:

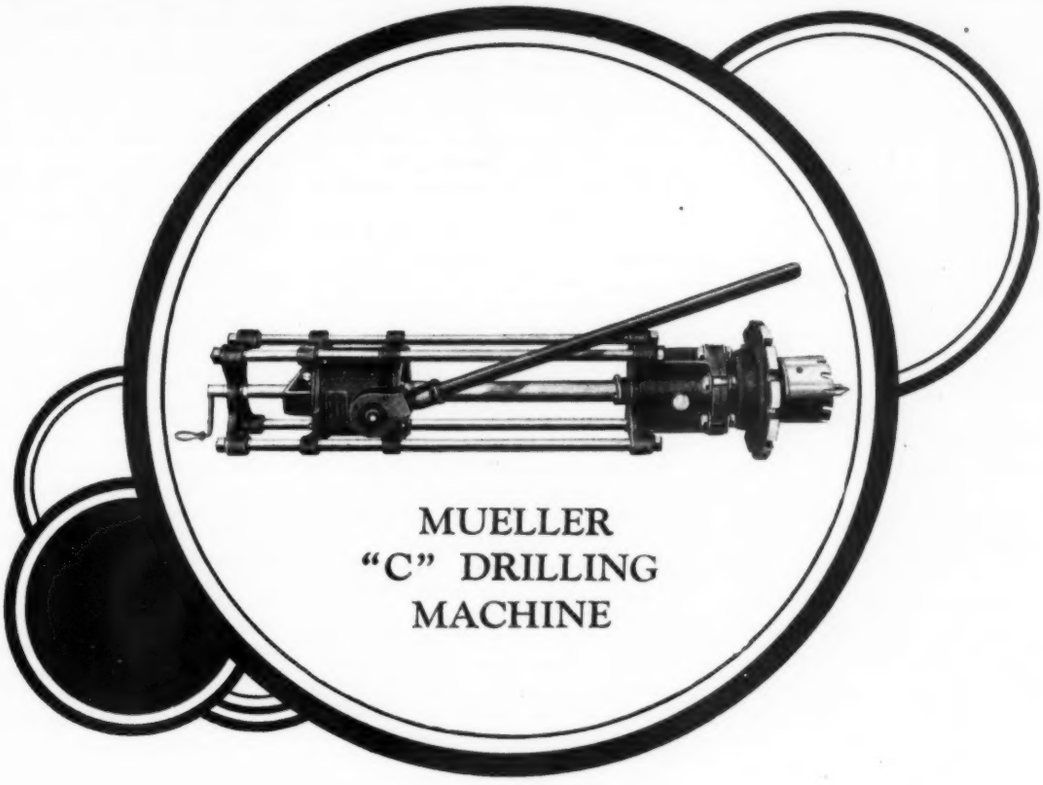
Swetland Publishing Company, 239 West 39th Street, New York, N. Y.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting is given; also that the said two paragraphs contain statements embracing affiant's knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corportion has any interest, direct or indirect, in the said stock, bonds or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (This information is required from daily publications only.)

JAMES T. MORRIS, Business Manager.

Sworn to and subscribed before me this 14th day of October, 1925.
(Seal)
H. H. MINER,
Notary Public, No. 224, New York County.
Register's No. 6001
(Commission Expires March 30, 1926.)



Light in Weight and Operation Yet built for sturdy strength

This drilling machine has become very popular with the water and gas trade, because it can be operated with speed and ease by one man in all except the large cuts.

The Mueller "C" Drilling Machine is built in a skeleton form to eliminate every unnecessary pound of weight. Working parts run in heavy greases and are encased in a dust-proof housing. Automatic feed prevents overfeeding the drill. Has one main shaft for all cuts, into which various sizes of drills are quickly fitted.

The Mueller "C" Drilling machine has bevel drive and makes lateral or branch connections 2 to 8 inches, inclusive, in pipe 4 to 48 inches. Comes in strong iron-bound chest, with compartments for machine and tools. Full information will be gladly supplied upon request.

MUELLER

MUELLER CO.
(Established 1857)
Factories: Decatur, Ill.; Port Huron, Mich.
Canadian Factory:
MUELLER, Limited, Sarnia
Branches:
New York, San Francisco, Los Angeles

(Continued from page 38a)

land Bartholomew, city planning expert, St. Louis, Missouri.

The City Plan of Des Moines, by C. A. Taubert, acting secretary, Des Moines Zoning Commission, Des Moines, Iowa.

Election of officers.

Wednesday Afternoon

Automobile drive.

Wednesday Evening

Report of Committee on Street Lighting, Ralf Toensfeldt, Chairman, St. Louis, Missouri, written by O. F. Haas, National Lamp Works, Nela Park, Cleveland, Ohio.

The Cost of Inadequate Street Lighting, by L. A. S. Wood, George Cutter Works, Westinghouse Electric and Manufacturing Company, South Bend, Indiana.

Modern Street Lighting, by F. H. Winkley, street lighting specialist, General Electric Co., Schenectady, New York.

Street Lighting Paper, by T. W. Rolph, managing engineer, Street Lighting Department, Holophane Company, Newark, Ohio.

Power Plant Development, by T. J. Lucas, chief engineer of Illinois Power and Light Corporation.

Report of Committee on Water Works, J. B. Hawley, Chairman, consulting engineer, Fort Worth, Texas, on topics in the Manual of the American Water Works Association.

The Des Moines Water Works, by Charles S. Denman, superintendent of water works, Des Moines, Iowa. (Illustrated).

What Constitutes Reasonable Rates for Public Utility Service, by Walter A. Shaw, consulting engineer, Chicago, Illinois.

Day Labor Construction in Public Works, by J. H. Ellison, vice-president, Associated General Contractors, Minneapolis, Minnesota.

Thursday, October 29, 1925

Morning

Report of Committee on Sewerage, Sanitation and Garbage Disposal, Samuel A. Greeley, Chairman, consulting engineer, Chicago, Illinois.

The Value of Comprehensive Plans for Sewer Systems, by A. L. Kurts, assistant engineer Sewerage Commission, Milwaukee, Wisconsin; by Pearse, Greeley and Hansen, Consulting Engineers, Chicago, Illinois.

Sewerage and Drainage Project of Des Moines, Iowa, by K. C. Kastberg, city engineer, Des Moines, Iowa.

Tunnel and Timber Work in Large Sewers in Sand and Water-Bearing Gravel, by George M. Shepard, chief engineer, Department of Public Works, St. Paul, Minnesota.

Stream Pollution, by Hans Pedersen, State Department of Health, Des Moines, Iowa.

Relation Between Stream Pollution and the Extent of Sewage Treatment Required, by J. K. Hoskins, U. S. Public Health Service, Cincinnati, Ohio.

Preliminary Treatment of Sewage as Affecting Rates on Sprinkling Filters, by A. L. Fales, Metcalf & Eddy, Boston, Massachusetts; by Dr. F. W. Mohlman, chief chemist, Sanitary District of Chicago, Illinois.

Experience With Sludge Digestion, by L. R. Howson, Alvord, Burdick & Howson, Chicago, Illinois; by C. E. Keefer, engineer of sewage disposal, Baltimore, Maryland.

A Critical Study of Heat and Power Requirements of Sewage Disposal Plants, by Robert Cramer, consulting engineer, Member of Sewerage Commission, Milwaukee, Wisconsin.

Equipment for the Collection of Garbage and Other Refuse Materials, by Paul Patton, contractor, Kansas City, Missouri; by W. J. Galligan, assistant superintendent of streets, Department of Public Works, Chicago, Illinois; by R. F. Stoelting, commissioner of public Works, Milwaukee, Wisconsin.

Thursday Afternoon

Report of Committee on Specifications for Bituminous Pavements, E. A. Kingsley, Chairman, city engineer, Dallas, Texas. (Report in 1924 Proceedings).

Report of Committee on Specifications for Brick Paving, Geo. F. Fisk, Chairman, Department of Engineering, Buffalo, New York.

Report of Committee on Specifications for Portland Cement Concrete Paving, E. E. Butterfield, Chairman. (Partly printed in 1924 Proceedings).

Report of Committee on Specifications for Stone Block Paving, Thomas E. Collins, Chairman, Elizabeth, New Jersey.

Report of Committee on Specifications for Wood Block Paving, Ellis R. Dutton, Chairman, assistant city engineer, Minneapolis, Minnesota. (Amendment to specifications printed in 1924 Proceedings).

Report of Committee on Specifications for Sidewalks and Curbs, W. H. Wise, Chairman, city engineer, Augusta, Georgia.

Preliminary Report of Committee on Specifications for Sewers, Frank R. Allen, Chairman, city engineer Pine Bluff, Arkansas.

Report of Committee on Subgrades and Foundations, H. Eltinge Breed, Chairman, consulting engineer, New York City.

Report of Committee on Specifications for Street Railway Pavement and Track Construction, E. A. Kemmler, Chairman, paving engineer, Akron, Ohio.

Report of Committee on Municipal Contract Forms, W. W. Horner, Chairman, chief engineer of sewers and paving, St. Louis, Missouri.

Discussion by Ward P. Christie, secretary, Associated General Contractors, Washington, D. C.; J. H. Ellison, vice-president Winston-Bear Company, Minneapolis, Minnesota.

Report of Committee on Public Safety, Alcide Chaussé, Chairman, Hon. Secretary, Canadian Institute of Architects, Montreal, Quebec, Canada.

Thursday Evening

Report of Committee on Public Welfare, Jefferson C. Grinnalds, Chairman, consulting city plan engineer, Baltimore, Maryland.

Report of Committee on Municipal Legislation and Finance, J. W. Reid, Chairman, being a paper on Municipal Finance by Chester E. Rightor, chief accountant of the Detroit Bureau of Governmental Research, Detroit, Michigan.

Reports of Representatives in Other Organizations: American Society for Testing Materials, A. H. Blanchard, E. S. Rankin, H. E. Breed, G. F. Fisk; National Research Council, R. K. Compton; Department of Commerce, Division of Simplified Practice, G. F. Fisk, F. R. Allen, A. W. Dow; American Engineering Council, R. K. Compton; American Engineering Standards Committee, F. P. Smith, H. E. Breed, C. E. DeLeuw, G. J. Wagner, H. Maetzel, R. Toensfeldt; International Council on City Planning, L. L. Tribus.

Report of Committee on Resolutions.

U. S. CIVIL SERVICE EXAMINATIONS

Junior Engineer—Applications received until November 14th. To fill vacancies in various branches of the Government service throughout the country. Entrance Salary, $1,860 with possible advance without change in assignment, to $2,400. Duties—routine testing, inspection of engineering material, drawing plans for minor projects, preparing specifications for engineering material or apparatus, performing field work, making computations, preparing maps, assisting in conduct of experimental research tests, compiling reports and handling technical correspondence.

Apprentice Draftsman — Applications received until November 10th. To fill vacancies in the Departmental Service at an entrance salary of $1,140, with possible advancement to $1,500. Duties —to make simple tracings, to keep data, make simple computations, assist in filing and indexing drawings and to perform miscellaneous minor duties in a drafting organization.

Instrument Repairman — Applications will be received until October 27th. To fill a vacancy in the Forest Service, Ogden, Utah, and in positions requiring similar qualifications. Entrance Salary of $1,680 may be advanced without change in assignment to $2,040 a year. Duties consist of those of a general repairman of technical instruments and equipment of various kinds.

Associate Sanitary Engineer, Assistant Sanitary Engineer. Applications will close October 27th. To fill vacancies in the Public Health Service throughout the United States. Entrance salaries of $3,000 and $2,400 respectively may be advanced without change in assignment up to $3,600 and $3,000 respectively. Duties are to carry on public health work including engineering problems, stream pollution, sanitary surveys, treatment of water, sewage and industrial wastes.

NEWS OF THE SOCIETIES

Dec. 2-4 — IOWA SECTION, AM. WATER WORKS ASSOCIATION. Annual convention at Dubuque, Iowa.

Dec. 3-4 — HIGHWAY RESEARCH BOARD. Annual meeting at Washington, D. C.

Jan. 11-15, 1926—AMERICAN ROAD BUILDERS' ASSOCIATION. Annual convention and road show at Chicago.

Jan. 18-23—ASSOCIATED GENERAL CONTRACTORS OF AMERICA. Annual meeting at Portland, Ore.

Jan. 20-22—AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual meeting at New York, N. Y.

Feb. 23-26—AMERICAN CONCRETE INSTITUTE. Annual convention at the Sherman Hotel, Chicago, Ill.

June 7-11—AMERICAN WATER WORKS ASSOCIATION. Forty-sixth annual convention at Buffalo, N. Y.

ASPHALT PAVING CONFERENCE

The fourth asphalt paving conference, held under the auspices of the Asphalt Association, met in Detroit, October 21 and 22, and was generally considered by those present to be the most successful of the conferences yet held. The subjects discussed had been selected with much wisdom by those in charge of the conference, as were also those who were asked to lead and follow in the discussions of these subjects; and the meetings were carried on with a promptness and vim that left no unprofitable moments for those who were interested in the subject. The papers almost without exception were of a practical nature rather than progress reports of scientific investigations. The conference was largely an exchange of experiences by men who had done practical work of high grade in the various methods of using asphalt in highway construction and maintenance.

In discussing Denver's black base paving program, A. K. Vickery, city engineer, stated that about one half million square yards of black base had been laid on sand loam and covered with 1½ inches of sheet asphalt top at a total cost of $2.41 a square yard. J. D. Strain stated that in Pittsburgh black base was used even for heavy-traffic streets up to 12 inches depth. Both of these cities had found this construction very satisfactory, as had also Grand Rapids, Mich., and Cortland, N. Y., according to statements made in the discussion.

Methods of resurfacing old roads and detailed costs of the same were given by G. C. Dillman, C. A. Paige, B. C. Harvey, W. H. Woodward, J. T. Bullen and others. In papers entitled "Service Record and Maintenance Costs and Methods" by R. H. Simpson, and "Methods and Appliances for Maintaining Asphalt Highways in Small Towns" by Hugh W. Skidmore, several suggestions were made of great value. W. J. Emmons contributed a paper on "Asphalt Paving Plant Management" and Prevost Hubbard one on "Asphalt Paving Mixtures."

The committee on resolutions included one opposing day labor construction which led to considerable animated discussion. A number of members were opposed to the motion or any action on the subject being taken by the conference, but ultimately the resolution was adopted by a large majority.

Over 200 were present at the meeting, nearly one-half of which were engineers and other officials engaged in designing or overseeing the construction of city streets or highways, nearly an equal number were road contractors, and the balance were representatives of the asphalt industry. Some of the papers are given, more or less in abstract, in this issue, and others probably will be given in later issues.

NEW YORK SECTION, AMERICAN WATER WORKS ASSOCIATION

A meeting of this section was held at the Ten Eyck Hotel, Albany, on September 26, with about 70 members present. In opening the business session of the meeting following the luncheon, Burt B. Hodgman, president of the section. urged the members to endeavor to secure a larger attendance at the meetings; and President Huey of the National Association and Beekman C. Little, past president of the association, addressed the meeting.

V. Bernard Siems then read a paper entitled, "Meeting a Drought Emergency" (this paper was published in the October issue). William H. Brush then read a paper entitled "Welding a Cracked 48-inch Cast Iron Pipe Under 20 Feet of Water." This paper as well as Mr. Siems' was illustrated by lantern slides. Mr. Brush's paper was discussed by Mr. Huey, Mr. Little, Reeves J. Newsom, George C. Andrews, J. Walter Ackerman and others. Mr. Brush remarked that, in spite of the newspaper publicity given to recent breaks in New York City's mains, there had been no more than in past years.

WEST VIRGINIA WATERWORKS CONFERENCE

The state health department and the state university of West Virginia cooperated in giving instruction in a short school for filter operators and waterworks superintendents from October 22 to 24, at Morgantown. The first day was devoted to lecture and laboratory work by the various professors at the university. In the afternoon a field trip was taken to the mountains four to six miles away from Morgantown, where the new improved water supply is obtained. About 75 took part in this trip, about 30 being students from the university and 45 being representatives of filter plants and waterworks men from various parts of the state. On the evening of the first day, C. F. Drake, superintendent of the Pittsburgh filtration plant, gave an interesting stereopticon lecture under the heading "Interesting Filtration Problems I have Met in Handling Allegheny River Water." He showed Pittsburgh's filtration progress during the period from 1907 to 1925 with a resulting typhoid death rate reduction from 125 to 2. During this evening and also that of the 23rd, the schools of public speaking and of music from the university furnished enjoyable entertainment and musical programs.

On Friday a large part of the time was devoted to round table discussions and an effort was made to have every waterworks man and filter operator present take part in them. During the afternoon, a practical demonstration of chlorine control apparatus was given by R. C. Clement, West Virginia representative of Wallace & Tiernan. In the evening a banquet was given for waterworks superintendents and filter operators, following which a combined meeting was held in one of the rooms of the university with the W. Va. Scientific Society. Sanitary engineer H. W. Streeter of Cincinnati, who has been doing experimental work on loading of filter plants for the U. S. Public Health Service, gave an excellent address showing the present trend of increase in stream pollution in the various states as well as the outcome, so far, of his experimental work. This meeting was attended by more than one hundred.

On the third day, a visit was made to Fairmont's new filter plant, located about 25 miles from Morgantown. The 45 waterworks men who took the trip were entertained by the water commissioner with a box luncheon served in the filter plant, and demonstrations of the control tests and record keeping were given by the chemist in charge, F. L. Rollins. At the end of the conference, the visitors attended a football game in the stadium of the West Virginia University.

The program included a number of papers and talks, most of them by members of the college faculty and of the state health department, and included such subjects as "How Certain Chemical Tests and Analyses Assist in Control of Public Water Supplies"; "Bacteriological Aspects of Water Analysis"; "Filter Plant Progress in West Virginia with Consequent Typhoid Reduction"; "Use of Dry Feed for Lime and Alum in Small Filter Plants"; "Co-operation Between Water Utilities and the State Department of Health Engineers"; "The Problem of the Small Water Company," and many others. To the chief engineer of the Division of Sanitary Engineering of the State Department of Health, E. S. Tisdale, belongs a large part of the credit for this successful conference. The university took a great interest in the matter and offered to co-operate in holding a similar conference next year.

IOWA SECTION—AMERICAN WATER WORKS ASSOCIATION

The 11th annual meeting of this section will be held at Dubuque, Dec. 2 to 4, with headquarters at the Julien Dubuque Hotel. The chairman of the local committee is J. W. McEvoy, superintendent of waterworks of Dubuque, and to him should be referred all matters regarding registration, exhibits and the like. Matters concerning the program should be referred to the secretary, Jack J. Hinman, P. O. Box 313, Iowa City.

HIGHWAY RESEARCH BOARD

The fifth annual meeting of the Highway Research Board will be held in Washington, D. C., December 3 and 4, and arrangements are being made to accommodate the 600 or more highway engineers and executives who are expected to be present. The meeting will be open to all persons engaged or interested in any branch of highway engineering. The program of the meeting as announced by Charles M. Upham, director of the board, is as follows:

THURSDAY, DECEMBER 3

Morning Session, 10:00 A. M.

Presiding officer, A. N. Johnson, University of Maryland.

Address of welcome by Vernon Kellogg, National Research Council.

Address by Thomas H. MacDonald, U. S. Bureau of Public Roads.

Report of Director, Chas. M. Upham, Highway Research Board.

Report of Committee on Economic Theory of Highway Improvement, T. R. Agg, Chairman, Iowa State College.

Report of Committee on Structural Design of Roads, A. T. Goldbeck, chairman, U. S. Bureau of Public Roads.

Afternoon Session, 2:00 P. M.

Presiding officer, A. J. Brosseau, Mack Trucks, Inc.

Report of Committee on Character and Use of Road Materials, H. S. Mattimore, Chairman, Pennsylvania Highway Department.

Report of Committee on Highway Traffic Analysis, G. E. Hamlin, Chairman, Connecticut State Highway Commission.

Report of Committee on Highway Finance, H. R. Trumbower, Chairman, U. S. Bureau of Public Roads.

Report of Special Investigation on Aspects of Urban Highway Finance Problems, by Jacob Viner, Highway Research Board.

FRIDAY, DECEMBER 4

Morning Session, 10:00 A. M.

Presiding officer, E. J. Mehren, Engineering News Record.

Report of Committee on Maintenance, W. H. Root, Chairman, Iowa State Highway Commission.

Progress Report on Development of Earth Roads, by S. S. Steinberg, Highway Research Board.

Report on Culvert Pipe Investigation, by R. W. Crum, Highway Research Board.

Afternoon Session, 2:00 P. M.

Presiding officer, W. K. Hatt, Purdue University.

Report on Economic Value of Steel Reinforcement in Concrete Roads, by C. A. Hogentogler, Highway Research Board.

Discussion by representatives from State Highway Departments of Ohio, Pennsylvania, New York, Massachusetts, Michigan, New Jersey, and Delaware.

Business meeting; Presiding officer, A. N. Johnson.

ASSOCIATED GENERAL CONTRACTORS

The executive board of the Associated General Contractors of America, at its meeting in Dallas in October, made the following nominations for 1926: for president, J. H. Ellison, vice-president of Winston-Dear Co.; for vice-president at large, Mat McDougall, vice-president and secretary of A. Guthrie & Co.; director for districts 2 and 3, for a 3-year term, Walter H. Gahagen, president of W. H. Gahagen, Inc., and for one year, G. C. Schierer, president of Chas. Berrick Sons Co.

Following this meeting it was announced that the A. G. C. has invited representatives of several national industrial organizations to meet with representatives of that association, "for the purpose of mustering a combined strength against governmental intrusion upon private enterprise" in the form of day labor construction. Among other subjects discussed were the lien laws, surety bonds, and the forms for contractors' questionnaires.

AMERICAN PUBLIC HEALTH ASSOCIATION

This association held its annual convention in St. Louis from October 19 to 22, at which it elected as president for next year Prof. C. E. A. Winslow; as vice-presidents, Drs. John A. Amyot, Max C. Stackloff, and A. J. Chesley; and as treasurer Dr. Louis I. Dublin. Buffalo was selected as the place of next year's meeting.

Most of the work of interest to public works engineers was that done by the sanitary engineering section. Incidentally this section changed its name to that of "Public Health Engineering Section," this change requiring that a new section with the latter name be created and the sanitary engineering section amalgamated with it.

This section held two sessions. Both chairman and vice-chairman being absent, C. M. Baker presided. Among the subjects discussed were, one on "mosquito control" by A. F. Dappert, assistant sanitary engineer of the Iowa state health department; "Water Supplies Along Highways" by E. L. Waterman, professor of sanitary engineering of the University of Iowa, W. H. Dittoe, sanitary engineer of the state Board of Health of Ohio, and H. F. Ferguson, sanitary engineer of the Illinois State Board of Health. Reports were received from the committees on water supply and purification, on refuse collection and disposal, on sewage and sewage disposal, and on the use of sewage sludge as a fertilizer. An abstract of the report of the committee on refuse incinerators is published elesewhere in this issue. The committee on sewage and sewage disposal reported progress in the preparation of definitions of terms used in sewage. Langdon Pearse, chairman of the committee on use of sewage sludge, reported on sales by Houston and Chicago and the expectations of Milwaukee. This section elected Abel Wollman as chairman, W. L. Stevenson as vice-chairman, A. E. Gorman as secretary, and Langdon Pearse, H. A. Whittaker and W. H. Dittoe as section council.

PERSONALS

Clark, Edward S., city engineer of Kalamazoo, Mich., has been appointed acting city manager beginning October 1st and will hold that position until a permanent city manager has been appointed.

Frahm, H. C., formerly district engineer for the North Dakota State Highway Department, has been appointed chief engineer of that department.

Creveling, James C., on October 21st, resigned the position of state commissioner of highways.

Boyer, Charles F., has been appointed superintendent of equipment of the Kentucky State Highway Department, in place of W. A. Duke, who recently resigned.

Snyder, A. E., has been appointed assistant city engineer of Salt Lake City.

Powell, Dwight, formerly county engineer of Canadian County, Oklahoma, has been appointed county engineer of Tillman County.

Wadsworth, G. A., superintendent of water works at Evanston, Ill., was killed by electric current on Oct. 1 while making repairs at the plant.

Hinderlider, M. C., for two years provisional appointee as state engineer of Colorado, has been confirmed in that position by civil service appointment.

Rupp, Wellington, has been appointed chief engineer of the State Department of Public Works of Washington.

Justis, Cleveland, resident engineer of the Delaware State Highway Department at Dover, was killed Sept. 5 by collision between his automobile and a train.

Keller, W. S., state highway engineer of Alabama for 14 years past, died Sept. 9.

Jessen, H. C., formerly principal Assistant Engineer of Salt Lake City, has been appointed City Engineer to succeed Sylvester Q. Cannon.

Haskell, Edward E., formerly assistant City Engineer of Santa Barbara, Calif., has been appointed City Engineer.

(*Continued on page 50*)

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

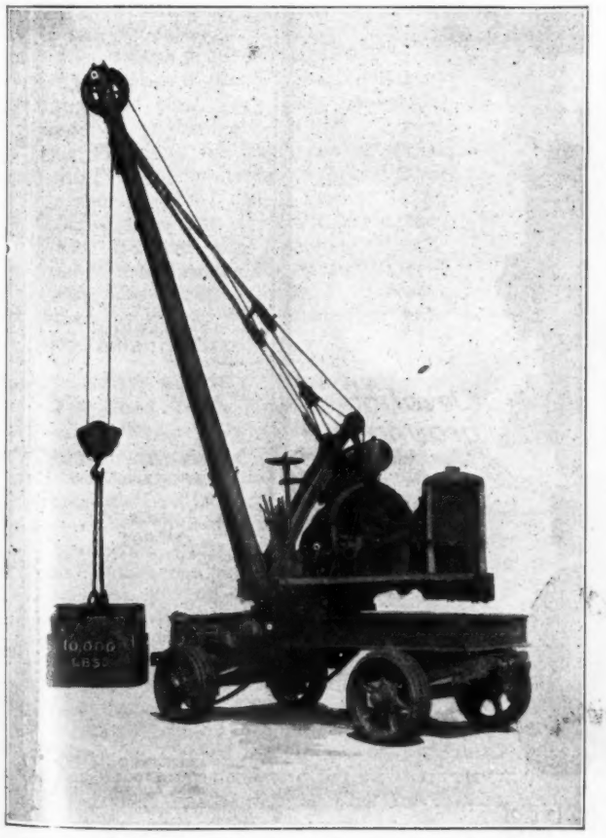
HARNISHFEGER TRUCK AND TRAILER CRANE

The Harnishfeger Corp., of Milwaukee Wis., has recently placed on the market a new crane known as the P. & H model 203A truck crane, which it claims embodies the combination of speed, compactness, light weight, sturdiness, and complete accessibility. The truck or trailer mounting enables it to move at regular truck speed in traveling between jobs; while on the job it has a line speed of 125 feet per minute and swing speed of 5 r.p.m. Compactness is achieved mainly by having all three drums mounted on one shaft, the hoisting and digging drums side by side and the boom hoist at the left side of the machine. This makes it possible to have all parts of the main machinery behind the center pin and serve in place of a counterweight. There are only four shafts in the whole machine and only eleven main gears and a set of planetary gears. This construction gives the short tail swing of 7 feet 1½ inches and an overall width of 8 feet 4 inches, thus enabling the machine to work in close quarters or travel in alleys. The total weight, not including that of the truck but including the entire crane equipment, is 13,000 pounds. Sturdiness is obtained by using cast steel for the revolving frame and drum bearing frames, and swing gear with I-beam spokes and outside teeth, there thus being no rivets to work loose. Any shaft on the machine can be removed without disturbing adjacent ones and every gear and bearing can be reached readily for lubrication. The revolving rollers can be removed from the top of the frame without jacking up the machine. Drum clutches and brakes are all of the outside band type, making adjustments and renewals easy.

The machine is built to handle a one-half yard clam shell bucket on a 25-foot boom, or for lifting 10,000 pounds at a 10-ft. radius. It is driven by a four-cylinder 40 h.p. motor operating at a governed speed of 1,000 r.p.m. The motor is placed on the rear of the revolving frame. A centrifugal pump is used for forced circulation. Lubrication of main and connecting rod bearings is by pressure feed. The motor clutch is twin disc type, fully enclosed, and supported in ball bearings. The two main drums are controlled by independent clutches and brakes and both run at the same speed, making it possible to use a clam shell bucket without special attachments and open or close it at any point. The boom hoist is located on the main drum shaft and is driven by planetary gears at a line speed of 62½ feet a minute. The line speed cannot exceed 125 feet when lowering, because of a self-locking connection to the drum shaft, making it impossible to drop the load unless the cables part. The four main levers are grouped at the front right hand of the machine, enabling the operator to use them while facing the work and watching the operating machinery.

When the trailer mounting is used, it releases the truck for hauling services, while mechanism is provided for self-propulsion at a speed of 1¼ miles per hour by means of a center drive shaft and two driving chains connected to it by jaw clutches. In either truck or trailer crane, the springs are relieved of all load when the crane is operating by means of jacks which screw down against the rear wheels.

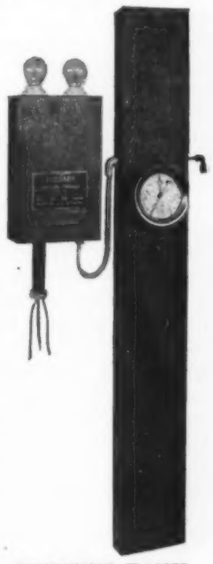
These cranes may be equipped with clam shell or drag line bucket, crane hook, electric magnet or pile driver.



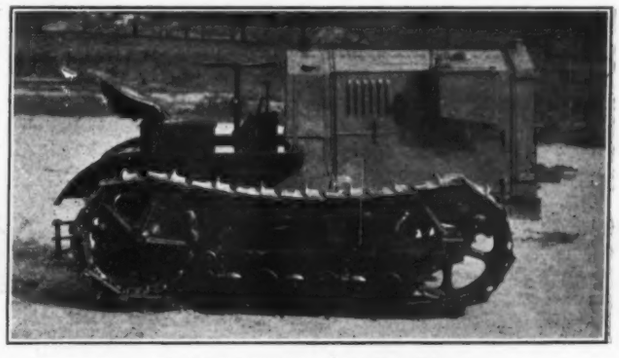
HARNISCHFEGER TRUCK AND TRAILER CRANE.

TANK LEVEL CONTROLLERS

Edward E. Johnson, Inc., of St. Paul, Minn., recently placed on the market a tank level controller which is offered as an absolute departure from the old type of controllers, designed to maintain within close limits any desired water level in elevated tanks. In this controller, a column of mercury is counter-balanced by the pressure of water in the tank. As water rises in the tank, mercury in a contact tube rises until it touches a contact point, when an electric circuit is closed, thereby energizing a relay which lights a green signal, indicating that the water has risen above the predetermined low level. As the water continues to rise, the mercury approaches a high-level contact and when it reaches it, another relay is energized which opens the pilot circuit in an automatic motor controller which stops the motor and pump. As the water falls in the tank, the mercury falls correspondingly until it drops away from a contact set at any point desired, de-energizing the relay which, in a similar manner, closes the pilot circuit in the pump controller, which starts the motor and pump. Once the high level has been reached and the motor and pump shut



JOHNSON TANK LEVEL CONTROL



NEW MODEL K CLETRAC.

off, they will not start again until the low level has been reached; and once the motor has been started at the low level, it will not stop until the high level is reached. The control may be located at any tank and the operating mechanism at a distant point, while the signal lights may be placed anywhere desired.

NEW MODEL CLETRAC

The Cleveland Tractor Co., of Cleveland, announces a new model "K" Cletrac for heavy duty. Among the new features are plain bearing lower track wheels. It is claimed that the new model will easily handle an eight-foot scraper with full bite or a three-bottom 14-inch plow. It is believed to be the only tractor which has an instantaneous oiling system, a simple push of a hand plunger thoroughly oiling the lower track wheels while the tractor is in motion.

The motor is a 4-cylinder 4 inch bore, 5½ inch stroke. It has two speeds forward, 2¼ and 4½ miles, and 2¼ miles reverse. Turning radius is 7½ feet, the steering being accomplished by the power of the motor through planetary compensating gears. There is a power take-off attachment giving a belt speed of 2,650 feet a minute.

UNIT CONTROL OF VALVES

Charles Cory & Son, Inc., of New York City, has developed a standardized unit control for motor operation of valves to which it has given the name Cory-Recony, which it offers as an efficient and dependable electrically operated system for remotely controlling valve operation from any number of points for either closing only, opening only, or opening, closing and throttling. No electric power circuits are opened in operating the unit but a separate power pannel is provided. The units may be operated in any position. Valves can be driven to the seat under full power, electric braking being provided at the motor, which stops the unit promptly. There are simple and positive adjustments for limit switches which are maintained until changed manually. Red and green lights at the control station indicate when a valve is open or closed. Safety to personnel is assured by a declutch when operating valve by hand or making repairs, a white light at the control station indicating when the safety clutch is out.

These control units are made in five different sizes which permit operation of any valve from 2 inches to 60 inches. They can be operated from single-phase alternating current with frequency of 25 to 60 cycles, or from direct current.

PENNSY PORTABLE AIR COMPRESSOR.

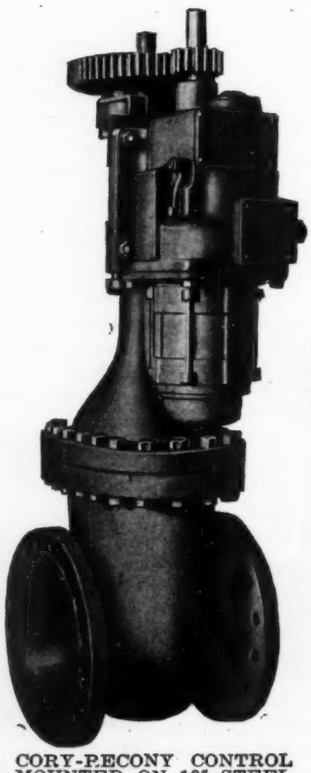
The unit mechanism is completely housed in a dust-tight, steam-tight and weather-proof case constructed of cast iron and compact. All important radial and thrust bearings are equipped with balls. An important feature is the motor controlling system that may be set to function within 1/40 of a revolution of the operating shaft and affords a complete range between limit settings of from 0 to 864 revolutions. Adjustments may be made at any time by turning knobs located on a limit switch plate.

The control station is equipped with three push buttons and three indicating lights, one for closing, one for opening, and the third for stopping the unit when it is desired to throttle the valve.

PENNSY PORTABLE AIR COMPRESSOR

The Pennsylvania Pump and Compressor Co., of Easton, Pa., manufactures a portable air compressor operated by a gasoline engine. Except for the smallest size, they are provided with a specially designed heavy-duty clutch that will not slip, having a positively engaging mechanism and with extremely liberal contact surfaces on clutch discs. By disengaging the engine from the compressor it is only necessary to crank the engine, running it until warmed up and then throw in the compressor without the delay of disconnecting and connecting driving bolts. The compressor is of the horizontal opposed cylinder type with a double throw crank shaft moving the pistons in and out together and thus securing perfect balance. The air capacity of the four different sizes of compressor varies from 100 cubic feet per minute piston displacement to 251 cubic feet, with air pressure of 100 pounds per square inch. The engine h.p. varies from 16 to 43 and the gasoline consumed from 1½ gallons per hour to 4½ gallons at full load.

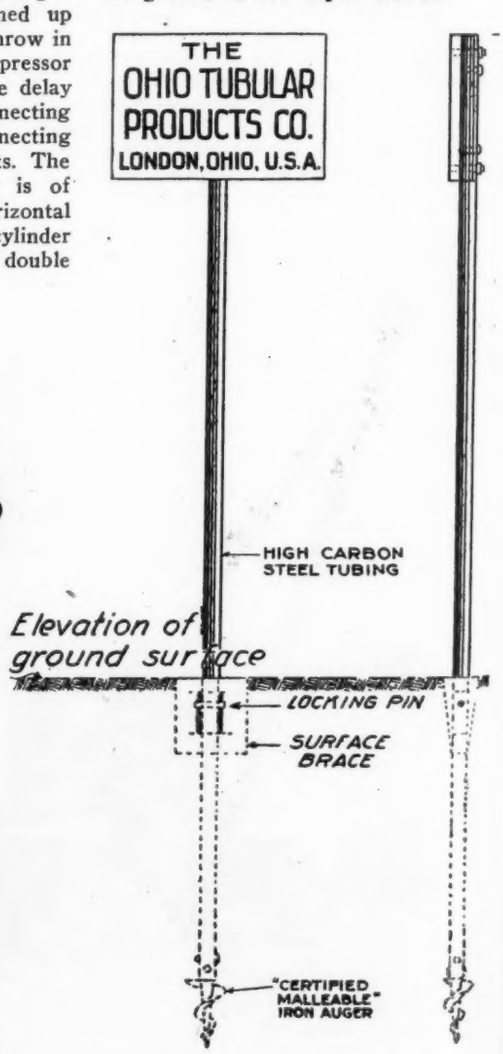
CONTROL STATION.



CORY-RECONY CONTROL MOUNTED ON 12" STEEL VALVE.

ONE MINUTE AUGER POST

The Ohio Tubular Products Co., of London, Ohio, manufactures an auger post which can be used for municipal street signs, highway signs and markers, mail boxes and many other purposes. The post is provided at the bottom with a malleable iron auger and is screwed into the earth by means of a stillson wrench without the necessity of digging a hole. Ten or twelve full turns will carry the post 30 inches into the ground, which can be done in about a minute in favorable soil. The posts can be made of any size or type, high carbon steel tubing being used. To brace the post in a lateral plane, a sheet steel plate is provided which is attached to the post and driven into the ground to the depth desired.



ONE-MINUTE AUGER POST IN PLACE.

NEW CATALOGS

HOISTING ENGINE BULLETIN

The Ested Machinery Mfg. Co., of Portland, Ore., has published this year, as it did last, a "Hyster Users' Service Bulletin," describing 18 ways of using the Hyster and describing the machine.

LINK-BELT 1875 TO 1925

Celebrating fifty years of existence, the Link-Belt Company has published an attractively illustrated book giving a brief history of the company and of the men who have been instrumental in building up its present extensive business, based originally on the patent of William E. Ewart for the detachable link chain, dated September 1st, 1874.

VIBROLITHIC BOOKLET

The American Vibrolithic Corp., of Des Moines, Ia., has issued a new edition of its booklet, in which the operations of vibrolithic construction are illustrated by new photographs throughout the book.

MEAD-MORRISON TRACTORS

The Mead-Morrison Manufacturing Co. of Boston, has just issued a catalog, number 26, describing its "55" tractor in great detail, with many illustrations showing the construction and many features of its operation.

TRAILER REFUSE COLLECTION

The Highway Trailer Co., of Edgerton, Wis., in a four-page folder describes the trailer system of garbage and ash collection as employed in several cities using its trailers.

BRASS PIPE PLUMBING

The Copper & Brass Research Association, of New York City, has published a phamphlet entitled "Brass Pipe Plumbing for Your Home," presenting the advantages of brass pipe for that purpose; also a reprint of a paper entitled "Brass and Copper for Water Services and Plumbing Pipe," presented before the American Waterworks Association by Wm. G. Schneider, of the Research Department of that Association.

SNOW REMOVAL PRACTICE

The Good Roads Machinery Co., of Kennett Square, Pa., has published a 48-page book entitled "The Hand Book of Snow Removal Practice" which discusses the subject of snow removal and snow removal equipment, amount of snowfall, etc., and describes the Good Roads equipment for snow handling. At the end of the book are 13 pages of cross section paper to be used in laying out snow removal plans.

LUBRICATION OF FIRE APPARATUS

The Vacuum Oil Co., of New York City, has reprinted in pamphlet form a paper by George A. Round of its engineering staff, presented before the International Association of Fire Engineers explaining "The Correct Lubrication of Motor Fire Apparatus," the paper, including the discussion, occupying twenty-one pages.

Service cannot stop

The telephone, like the human heart, must repair itself while it works. The telephone system never rests, yet the ramifications of its wires, the reach of its cables and the terminals on its switchboards must ever increase. Like an airplane that has started on a journey across the sea, the telephone must repair and extend itself while work is going on.

To cut communication for a single moment would interrupt the endless stream of calls and jeopardize the well-being and safety of the community. The doctor or police must be called. Fire may break out. Numberless important business and social arrangements must be made.

Even when a new exchange is built and put into use, service is not interrupted. Conversations started through the old are cut over and finished through the new, the talkers unconscious that growth has taken place while the service continues.

Since 1880 the Bell System has grown from 31 thousand to 16 million stations, while talking was going on. In the last five years, additions costing a billion dollars have been made to the system, without interrupting the service.

AMERICAN TELEPHONE AND TELEGRAPH COMPANY
AND ASSOCIATED COMPANIES
BELL SYSTEM
One Policy, One System, Universal Service

WESTINGHOUSE STREET LIGHTING EQUIPMENT

The Westinghouse Electric & Mfg. Co., of South Bend, has published several new catalogs on outdoor lighting, one entitled "Overhead Street Lighting Equipment," a complete catalog of street hoods and street hood brackets, mast arms, pole line materials, etc.; another entitled "Ornamental Street Lighting," which deals with ornamental standards of various designs, brackets, ornamental lighting units and other details. Also a 4-page folder describing the Westinghouse highway lighting unit. All of these are profusely illustrated with photographs and diagrams of details.

HAUK METER INVESTIGATION

A special survey of Hauk concrete heaters has been made by the A. C. Nielsen Co. of Chicago, copies of the report of which will be furnished by

(*Continued on page 50*)

JIFFY PORTABLE SAW-RIG

The A. S. Aloe Co., of St. Louis, Mo., manufactures a portable saw-rig which it calls the "Jiffy," which is run by gasoline, the makers claiming that a gallon of gasoline will run it ten hours. The saw proper is the distinguishing feature, being a new and improved arbor type which moves through the lumber instead of the lumber being pushed against it. It is an eight-inch all-purpose blade that cross-cuts, rips, and miters with equal facility. The rig is mounted on rubber tired disk wheels which are drawn out of the way when the saw is being used, but which permit moving readily from place to place. The total weight is only 225 pounds.

The motor is a ¾ h. p. single cylinder 4-cycle. It is started and stopped by means of a foot lever. The saw will take any material up to 1x15 or 2x12. It is claimed that the average daily cutting capacity with one man and helper will reach from 8,000 to 10,000 feet of board or dimension, or that it will make an average of 200 to 300 2x8 cuts an hour.

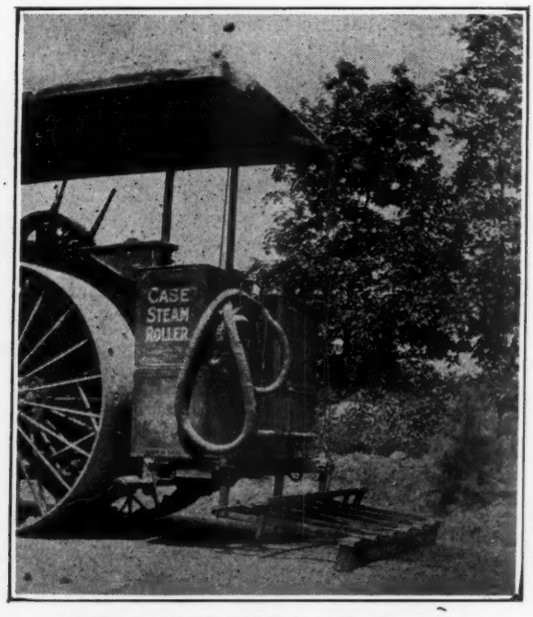
JIFFY PORTABLE SAW RIG.

FREEMAN ROAD SWEEPING ATTACHMENT

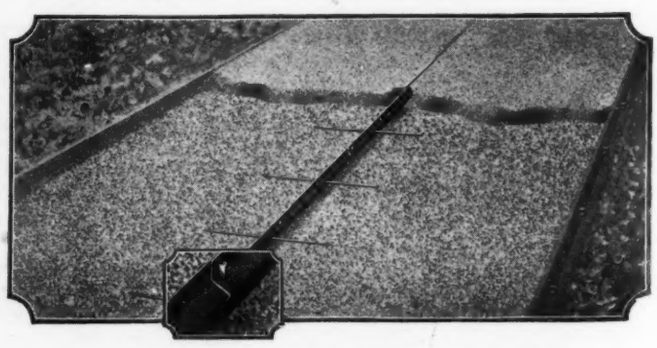
J. M. Freeman, of Elizabethtown, Pa., manufactures an attachment to be applied to the front or rear of any power road roller for sweeping road surfaces in connection with compacting the same. It was especially devised for sweeping the surface of waterbound macadam in place of hand sweeping. The maker claims that the attachment does the sweeping more thoroughly than if done by hand and with no expense. The attachment consists of six brooms, more or less, attached at the ends of levers which in turn are hinged to an angle iron which is attached to any convenient point in the front or rear of the road roller. The brooms are pivoted at the ends of the levers so that they can both rock and rise or fall, adjusting themselves to irregularities in the surface. By means of a lever operating a lift bar, the brooms can be raised from the surface when not in use.

CONTRACTION ROAD STRIPS

The Milwaukee Corrugating Co., of Milwaukee, Wis., manufactures contraction road strips for longitudinal center joints of concrete roads to prevent the formation of irregular cracks that are apt to form down the centers of such roads. They provide for the locking joint adopted by the highway departments of a number of states. Holes for ½-inch round reinforcing side bars are placed 5 feet apart center to center, and holes for wedge pins are spaced 3 feet 4 inches. The wedge pins insure a tight joint and maximum strength and rigidity at the juncture of two road strips, and are driven down so that the top is about ¼ inch below the top edge of the road strip. The strips are made in standard lengths, and varying from 4½ inches to 7½ inches high, 16 and 18 gauge steel being used. The 4½-inch strips weigh about 1,084 pounds per 1,000 lin. feet where the depth of the V is 1½ inches, and 938 pounds where the V is one inch deep; while the 7½-inch strips weigh 1,875 pounds and 1,672 per 1,000 ft. for the 1½-inch and 1-inch V's respectively.



FREEMAN SWEEPING ATTACHMENT.



CONTRACTION ROAD STRIP IN PLACE.

HIGH DUTY GASOLINE ENGINE

The Sterling Engine Company of Buffalo, New York, has recently developed an engine for pump service or for driving electric generators or other units for emergency or stand-by service, which is rated 225 h. p. at 1200 revolutions. The company states that this engine is a unique departure from the average gasoline engine. It is built in 6 cylindres with removable cylinder sleeves for replacement and with an added advantage of uniform cooling. It has a 7-bearing counter weighted crank shaft dynamically balanced; dual valves in the head with overhead cam-shafts; a safety device against backfiring on the carburetors; vacuum fuel supply system; oil cooler and filter with high pressure lubricating system; and all of the working parts are completely enclosed.

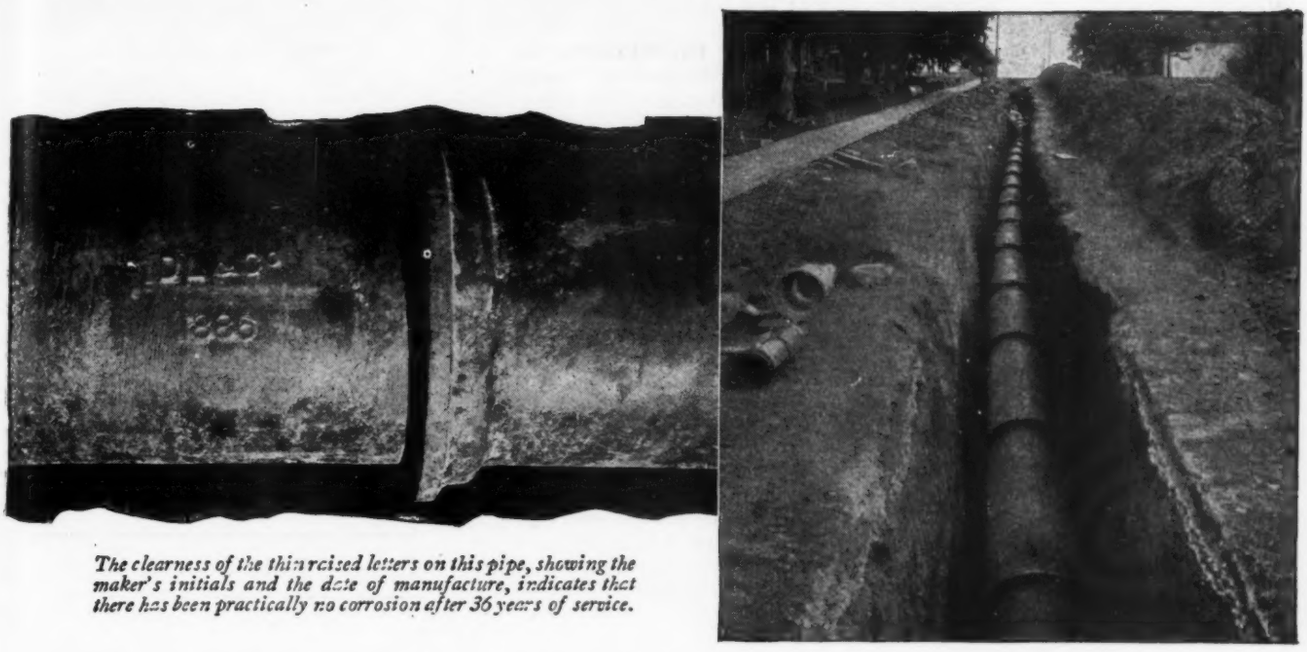
INDUSTRIAL NOTES

McWANE CHICAGO OFFICE

The McWane Cast Iron Pipe Co. of Birmingham, Ala., has added to its list of sales offices, one at 208 South LaSalle St., Chicago, with Shirley W. Harrison in charge. This office will cover the territory north of the Ohio and Missouri rivers, west to Montana.

GAS ELECTRIC BUSSES

The General Electric Company of Schenectady, N. Y., reports that Los Angeles and Portland, Ore., have adopted busses equipped with gas-electric drive, which type had already been used in Philadelphia, Atlanta, Ga., Albany, N. Y., and Kansas City, Mo. In this type of drive a gasoline engine is direct connected to an electrical generator which in turn furnishes current for the operation of two electric motors, by which power is transmitted to the road wheels. Gear shift is eliminated, and it is claimed that there is more rapid acceleration without jerking, higher schedule speeds are possible, maintenance costs are reduced, and there is greater comfort for the passengers.



The clearness of the thin raised letters on this pipe, showing the maker's initials and the date of manufacture, indicates that there has been practically no corrosion after 36 years of service.

Cast Iron Pipe Need Never be Discarded

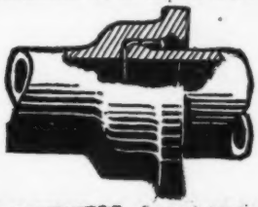
THIS 24-inch Cast Iron Pipe was laid in Omaha in 1886, and served as a pumping line from the old station at Sixth and Burt Streets. The station was abandoned in 1912 on the account of the contamination of this source of water supply. The pipe was used as a supply line for ten years longer, and was then taken up and relaid as a pumping line from the Walnut Hill Station.

Contingencies which necessitate relaying of pipe may occur in the best of water systems. For instance, larger mains may be needed; streets may be abandoned; a pumping station may be abandoned or a new source of water supply developed; or streets may be re-graded, necessitating lowering or raising of the main. For this reason it is important to bear in mind that Cast Iron Pipe may be easily dug up and relaid; and that *after centuries of service,* it will be found still in good condition and ready for re-installation elsewhere.

THE CAST IRON PIPE PUBLICITY BUREAU, Peoples Gas Building, Chicago

CAST IRON PIPE

THE BELL & SPIGOT JOINT



THE ACCEPTED STANDARD FOR UNDERGROUND CONSTRUCTION

Our new booklet, "Planning a Waterworks System," which covers the problem of water for the small town, will be sent on request

Send for booklet, "Cast Iron Pipe for Industrial Service," showing interesting installations to meet special problems

WEHR COMPANY EXECUTIVE

The Wehr Co. of Milwaukee announces the recent appointment of G. C. Salisbury as sales manager. Mr. Salisbury takes the place of E. C. Myers who will continue to act as general manager of the company, devoting particular attention to designing and production problems.

LIBERTY ELECTRIC SALES REPRESENTATIVE

Joseph McKay, Jr., on October 1st became associated with the Liberty Electric Association of Stamford, Conn., as New York and Philadelphia district sales representative on Liberty valve operators and control equipment. His headquarters will be at 342 Madison Ave., New York City.

NEW VIBROLITHIC VICE-PRESIDENT

The American Vibrolithic Corp. of Des Moines, Ia., announces the appointment of Norman D. Dean as vice-president in charge of operations. Col. Dean's duties will be chiefly connected with the sale, construction and technical features of vibrolithic pavements and "interlocking" bases.

WHITE BUS SALES

The White Co., of Cleveland, announces that, following the purchase of thirty White busses by the Cleveland Railway Co., a few months ago, that company has now placed an order for thirty additional busses. The company reports that there are more than 1,200 White busses being used by railways to supplement trolley service.

UNUSUAL SERVICE OF CLIMAX ENGINE

The Climax Engineering Co. of Clinton, Ia., informs us that an Orton & Steinbrenner crane equipped with a 4 h.p. Climax engine pulled 15 cars of sand and gravel by means of a cable, a switch engine not being available for the service without considerable delay.

SULLIVAN OFFICE CHANGES

The Sullivan Machinery Co., of Chicago, announces that its Cleveland office has moved from Room 701 Rockefeller Bldg. to Room 1506 in the same building, R. T. Stone remaining as manager. In Sidney, New South Wales, the company's office has been changed from Australasia Chambers to Kembla Building.

The company was represented at the All-Western road show in San Francisco this month, exhibiting the Sullivan angle type portable compressor, portable turbinair hoist, the Sullivan rotator, concrete breakers and clay spaders, all in operation.

SECURITY CEMENT AND LIME CO.

The properties and assets of this company were taken over on October 13th by the North American Cement Corporation, which assumed all contracts and unsettled business of the old company. There will be practically no change in management or in policy.

CLIMAX ENGINEERING CO.

The Climax Engineering Company, of Clinton, Ia., announces the appointment of the Coast Machinery Corp., 829 Folsom St., San Francisco, as its sales representative for North California. Edward Crowley, recently general sales manager of the Climax Engineering Co., is president of the Coast Machinery Corp. Other new dealers handling the Climax engines are: the George W. Whitehead Co., 61 The Terrace, Buffalo, N. Y.; Edward C. Dingman, 1005 Keefer Building, Montreal; Harvard Turnbull & Co., Ltd., 912 Excelsior Life Bldg., Toronto; Advance Contractor Repair Co., 1332 West Lake Street, Chicago, Ill.; Mine & Smelter Supply Co., 121 West 2nd St., Salt Lake City, Utah.

LE ROI GASOLINE ENGINES

Le Roi Company, Milwaukee, Wisconsin, manufacturers of gasoline engines, state that the business of that company has increased 867 per cent since 1921. In 1925 there has been an increase thus far of 40 per cent over 1924.

This company claims that in analyzing the progress of their business it was shown that the increase in the sale of parts has been less than half that of the sale of new engines which indicates small cost of maintenance.

NEW CATALOGS

(Continued from page 47)

the Hauk Co. This covers the operating cost, and comparison of this with the cost of heating concrete aggregates separately.

RAYMOND COMPOSITE PILES

The Raymond Concrete Pile Co., of New York, describes, in a 24-page pamphlet, a composite pile consisting of a wooden pile cut off below permanent low water, above which is superimposed a Raymond concrete pile.

TRI-UTILITY ROAD BUILDER

The Acme Road Machinery Co., of Frankfort, N. Y., is distributing a broadside setting forth the advantages of the "Tri-utility" road builder, a combination of roller, grader and scarifier.

STREET LIGHTING GLASSWARE

The General Electric Co., of Schenectady, N. Y., has published a new bulletin GEA-103, giving detail description and numerous photographs showing the steps in the manufacture of its lighting units, a discussion of refractors and dimensional diagrams of the different types of outer globes, canopies and panels.

PENNSYLVANIA PUMP AND COMPRESSOR CATALOG

The Pennsylvania Pump and Compressor Co., of Easton, Pa., has ready for distribution a new general products catalog, well illustrated, describing very concisely the company's complete line of products.

BUHL COMPRESSORS

The Buhl Co., of Chicago, has recently issued a new bulletin, No. 90 C, describing its portable compressors type C, and giving details of construction.

PORTABLE HOIST CATALOG

The Sullivan Machinery Co. has issued a new bulletin, No. 76F, describing the Sullivan turbinair portable hoists, both single drum and double drum.

OSGOOD GAS SHOVEL

The Osgood Company, Marion, O., has prepared a new 12-page bulletin, No. 2514, describing its heavy-duty gas shovel, which was introduced at the Chicago road show last year.

PERSONALS

(Continued from page 44)

James, James K., has been reappointed City Engineer and Street Superintendent of Santa Cruz, Calif.

Carr, George E., formerly Division Engineer for the Ohio State Highway Department, has been appointed Chief Engineer of the Bureau of Maintenance.

Schlesinger, George F., formerly State Engineer of Ohio, has been appointed Director of Highways and Public Works of that state.

Kirk, Harry J., formerly Chief Engineer of the Bureau of Maintenance, Ohio State Highway Department, has been appointed State Highway Engineer to succeed George F. Schlesinger.

Weymouth, C. R., formerly division engineer with the Wisconsin Highway Commission, has been appointed engineer of design.

Vroman, H. W., formerly division engineer No. 6, Wisconsin state highways, has been transferred to Division No. 2, at Milwaukee.

Mack, W. W., has been appointed acting chief engineer of the Delaware State Highway Department during the leave of absence of chief engineer C. D. Buck.

Goldbeck, A. T., formerly chief of the Division of Tests, U. S. Bureau of Public Roads, has accepted the position of director of the new engineering bureau of the Nation Crushed Stone Association.

Beck, Edward A., city manager of Lynchburg, Va., since 1920, died Oct. 18, following an operation for apendicitis.

Pritchard, John C., formerly assistant engineer of the Supply and Purifying Division of St. Louis water department, has been made water commissioner, succeeding E. E. Wall.

Lucas, Hugh L., for 17 years superintendent of the Chicago Water Pipe Extension Bureau, died on October 20.

Hill, Curtis, formerly state highway engineer of Missouri, died October 18, in his 55th year.

THE INSLEY EXCAVATOR

Not to do the work of a large shovel—But to do the work a large shovel can't do—PROFITABLY

"Delighted with its Work"

AFTER years of experience owning and operating excavating machinery, the City of Atlanta found what they wanted in the Insley Excavator. Based on their long experience, covering a wide range of work, they can speak with authority.

What the City of Atlanta needed was a machine to dig main sewer and water trenches, and at the same time dig laterals.

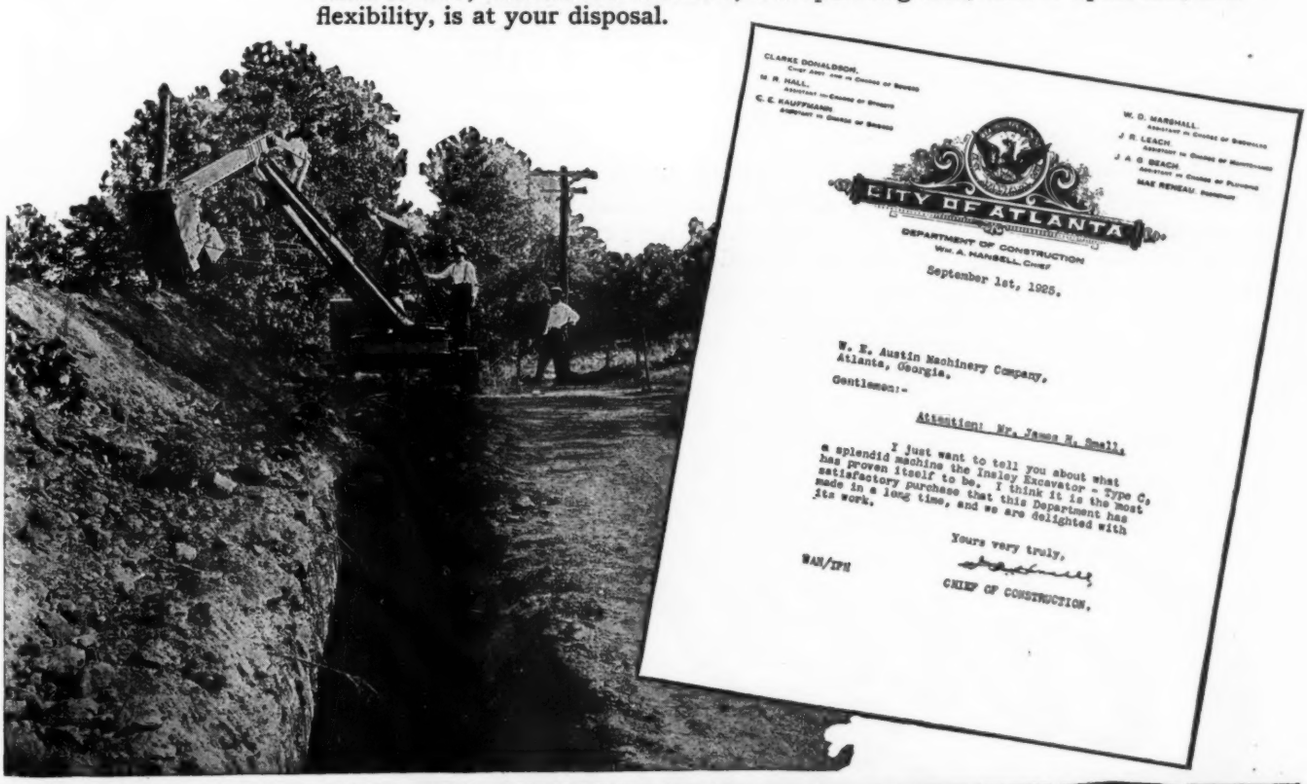
The Insley appealed to them primarily because it is light and easily moved, being mounted on extra large full crawlers, and because it has ample power to meet any digging condition satisfactorily.

That the Insley met their needs is shown by the letter below. But that is not all. It won their confidence because on the one hand it got in and out of places and did work that no excavator had done before, such as digging laterals which had previously been done by hand, and likewise because it dug main trenches with greater ease and speed, and at a smaller labor cost than heavier excavators.

And best of all, the purchase price of the Insley was about half of what they were accustomed to pay for an excavator.

The same needs that exist for the City of Atlanta confront you on sewer work and light excavating. And the same Insley Excavator that served Atlanta so well, with its low first cost, low operating cost, ease of operation, and flexibility, is at your disposal.

INSLEY
CONCRETE PLACING EQUIPMENT
STEEL DERRICKS
BUCKETS AND CARS
EXCAVATING EQUIPMENT
No. 460



CLARKE DONALDSON,
Chief Asst. and in Charge of Sewers
H. R. HALL,
Assistant in Charge of Streets
C. E. KAUFFMANN,
Assistant in Charge of Sewers

W. D. MARSHALL,
Assistant in Charge of Sidewalks
J. R. LEACH,
Assistant in Charge of Maintenance
J. A. G. BEACH,
Assistant in Charge of Planning
MAE REINEAU, Stenographer

CITY OF ATLANTA
DEPARTMENT OF CONSTRUCTION
WM. A. HANSELL, Chief

September 1st, 1925.

W. E. Austin Machinery Company,
Atlanta, Georgia.

Gentlemen:-

Attention: Mr. James H. Snell.

I just want to tell you about what a splendid machine the Insley Excavator - Type C, has proven itself to be. I think it is the most satisfactory purchase that this Department has made in a long time, and we are delighted with its work.

Yours very truly,

WAH/IPH

CHIEF OF CONSTRUCTION.

INSLEY MANUFACTURING CO.
Engineers and Manufacturers
INDIANAPOLIS

THE INSLEY IS LITERALLY A DIRT EATER EXCAVATOR

Pennsylvania State Highway 156, Easton to Philadelphia. Frank J. Groman, Bethlehem, Pa., Contractor. Carey Elastite Expansion Joint used.

The Camino Real, oldest commercial highway in the United States, near Albuquerque, N. Mex. Carey Elastite Expansion Joint used, at 30 foot intervals.

The old "trails" are modern "highways"

MOST of the broad modern concrete roads that stretch across the country were primitive wagon trails less than three generations ago, and it is only in the last ten years that we have learned to build these highways quickly and economically out of permanent concrete.

Success was assured in concrete road construction when engineers learned how to protect these great concrete slabs against the destruction caused by expansion and contraction due to temperature changes. Carey Elastite Expansion Joint solved the problem completely, practically and cheaply.

Today few engineers attempt to build a concrete road, street or other large concrete structure without Carey Elastite Expansion Joints. Experience has proved their necessity.

Send for this book — a complete manual on installation of expansion joint — and free pocket scale giving valuable data on use of concrete material, and other information for engineers, also list of principal cities from which Elastite Expansion Joint shipments are made.

THE PHILIP CAREY COMPANY
10 Wayne Ave., Lockland, Cincinnati, O.

Carey Elastite

NAME REG. U.S. Patent Office

EXPANSION JOINT
PROVED AND ACCEPTED

12-25

Elastite Expansion Joint is an elastic resilient material composed of two sheets of asphalt-saturated felt between which is "sandwiched" a body of carefully refined asphaltic compound.

Above: North and South Hyperion Sewage screening plants. Los Angeles, Cal.

At Left: Screen House at East San Pedro, Cal.

Above: Screen House at St. Petersburg, Fla.

Above: Screen House at Pasadena, Cal.

Right: Screen House at Charlotte, N. C.

DORRCO

This symbol identifies all DORR equipment

A few of the many Dorrco Sewage Screening plants. This screen is used by progressive cities in all parts of the country.

Write for particulars

THE DORR COMPANY

ENGINEERS

247 Park Avenue New York City

Denver, 1009 17th St. London, 16 South St., E. C. 2

Chicago, 310 South Michigan Ave. Wilkes-Barre, 536 Miners' Bank Bldg, Los Angeles, 108 West 6th St.

INVESTIGATION TESTS DESIGN EQUIPMENT

The modern Roadway Guard

Never has been broken through

No. 6 Copper-bearing Steel Wire

2 Inch Mesh

Greater Protection

"Galv-After" Fabric

No Annual Painting

Minimum Upkeep Expense

One Man Can make all ordinary Repairs

Adopted as Standard by Leading Highway Commissions

Saves Lives!

Saves Dollars!

For Curves, Culverts, Bridge Approaches, Embankments, Road Terminals

SEE Cyclone ROAD-GUARD

N. C. B.
Spaces 31, 33, 35

Road Show
Jan. 11th to 15th
Chicago, Illinois

CYCLONE FENCE COMPANY
FACTORIES and OFFICES:
Waukegan, Ill. Cleveland, Ohio
Newark, N. J. Fort Worth, Texas
Pacific Coast Distributors:
Standard Fence Co., Oakland, Calif.
Northwest Fence & Wire Works, Portland, Ore.

Cyclone Red Top Fence

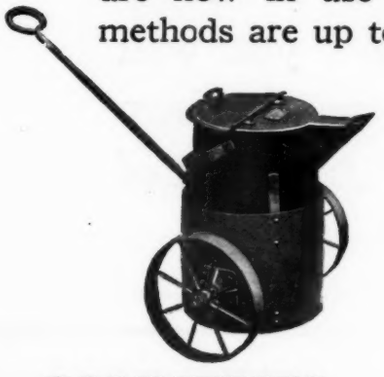
The Mark of Quality

In Demand by Contractors and Municipalities Everywhere!

Because of their superior qualities and their ability to conform to modern methods of road building and maintenance

CONNERY'S
TAR AND ASPHALT HEATERS

are now in use by municipalities and contractors whose methods are up to the minute.



CONNERY'S PORTABLE PATCHING HEATER

An outfit used by Highway Division Superintendents for small patching jobs. Just the thing for repairing small holes in the road. A handy kettle for filling expansion joints or miscellaneous work requiring a small quantity of tar or asphalt.

Twenty styles and sizes to meet every requirement in capacity of 10 to 1000 gallons.

For road work or general construction you can't go wrong when you have a Connery's Heater on the job. The complete line is illustrated and described in our little "Blue Book." Write for it.

Connery & Company, Inc.

3900 N. Second Street

PHILADELPHIA, PENNA.

CONNERY'S—Held by the Weld

Warrenite - Bitulithic Pavement

The man who is hard to please is the man we like to meet. When a human question mark gets us on the stand and probes into the innermost secrets of the road making problem, we know we've made a friend. The deeper you investigate, the further you inquire, the more certain you are to demand our pavements. That's why we say, "Ask us anything and everything. Search every record of performance, and make us prove what our products will do." On this basis we know you will learn to expect a lot when you do buy Warrenite-Bitulithic Pavement. And best of all—we know you will get it.

Warren Brothers Company

A national organization to build good roads

EXECUTIVE OFFICES:

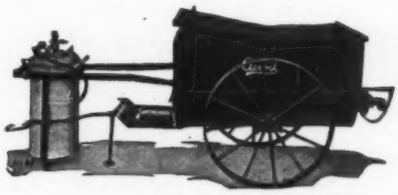
9 Cambridge Street, Boston, Mass.

DISTRICT OFFICES

New York, N. Y.
Portland, Ore.
St. Louis, Mo.
Winnipeg, Man.
Harrisburg, Penn.
Vancouver, B. C.
Chicago, Ill.
Phoenix, Ariz.
Washington, D. C.
Salt Lake City, Utah
Utica, N. Y.
Minneapolis, Minn.
Oakland, Cal.
Toronto, Ont.
Birmingham, Ala.
Memphis, Tenn.
Los Angeles, Cal.
New Orleans, La.
Dallas, Tex.
Charlotte, N. C.
Oklahoma City, Okla.

"SMOKELESS" OIL BURNING PAVING TOOLS

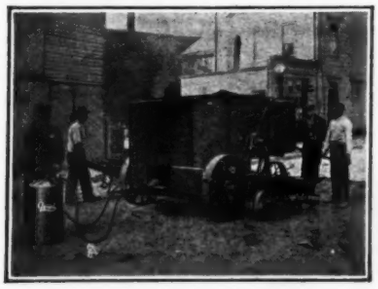
Two Aeroil Kettles used on a Granite Paving Job.



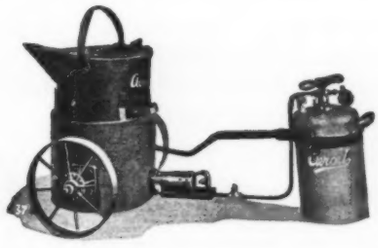
Use Aeroil Kettles on City Streets. No Smoke—No Ashes—No Sparks.

AEROIL "SMOKELESS" ASPHALT KETTLES HEAT TWICE AS FAST AS WOOD-BURNING KETTLES

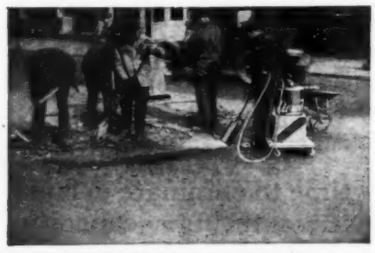
Made in five sizes—Mounted on Legs or on Wheels—Ask for Bulletin No. 44A.



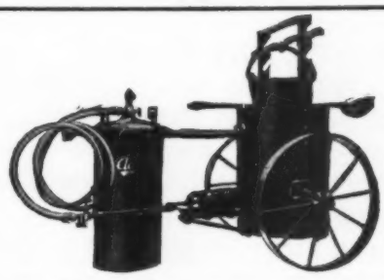
500 Gal. Woodburning Type Asphalt Kettle Heated with Aeroil Kerosene Burners. Ask for Bulletin No. 48.



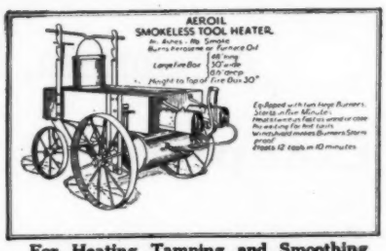
Aeroil Patrol Patching Heater with 18-Gal. Pouring Pot. Described in Bulletin No. 44A.



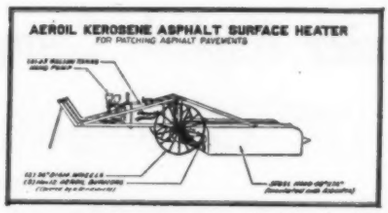
Patching Asphalt Pavements with Aeroil Kerosene Torches. Described in Bulletin No. 48.



Aeroil Lead Melting Furnaces. Made in three sizes—on legs, or on wheels. Ask for Leaflet No. 45.



For Heating Tamping and Smoothing Irons, Rakes, Shovels, Picks, etc.



Large Heater for Re-surfacing Asphalt Pavements—Covers Surface 48" x 72".

Send for Specifications and Prices—"Smokeless" Heaters are splendid investments

AEROIL BURNER COMPANY, Inc.

Main Street and Hudson Avenue ***UNION CITY, NEW JERSEY***

Other Products: Concrete Heaters, Thawing Torches, Water Heaters, Salamanders, Oil Burners for Road Oil Wagons, and Special Heaters

HOOSIER

HOOSIER EXPANSION JOINT

JOINT FACTS

HOOSIER EXPANSION JOINT

QUALITY

HOOSIER EXPANSION JOINT is carefully manufactured from the highest QUALITY materials suitable for the purpose. The asphalt is produced and processed in our own plant to insure a particular and uniform material.

ECONOMY

HOOSIER EXPANSION JOINTS are reasonably priced to permit the greatest economy in construction.

HOOSIER EXPANSION JOINTS decrease maintenance costs.

HOOSIER

HOOSIER

APPROVED

HOOSIER EXPANSION JOINTS are approved in such states as Pennsylvania, New Jersey and New York where rigid technical specifications are used.

HOOSIER EXPANSION JOINTS will pass any high grade specification.

SERVICE

HOOSIER EXPANSION JOINTS are furnished on time to eliminate delays. Large manufacturing capacity and stocks reduce delays in shipment to a minimum.

HOOSIER EXPANSION JOINT

Manufactured by

Hoosier Asphalt Company **Alexandria, Ind.**

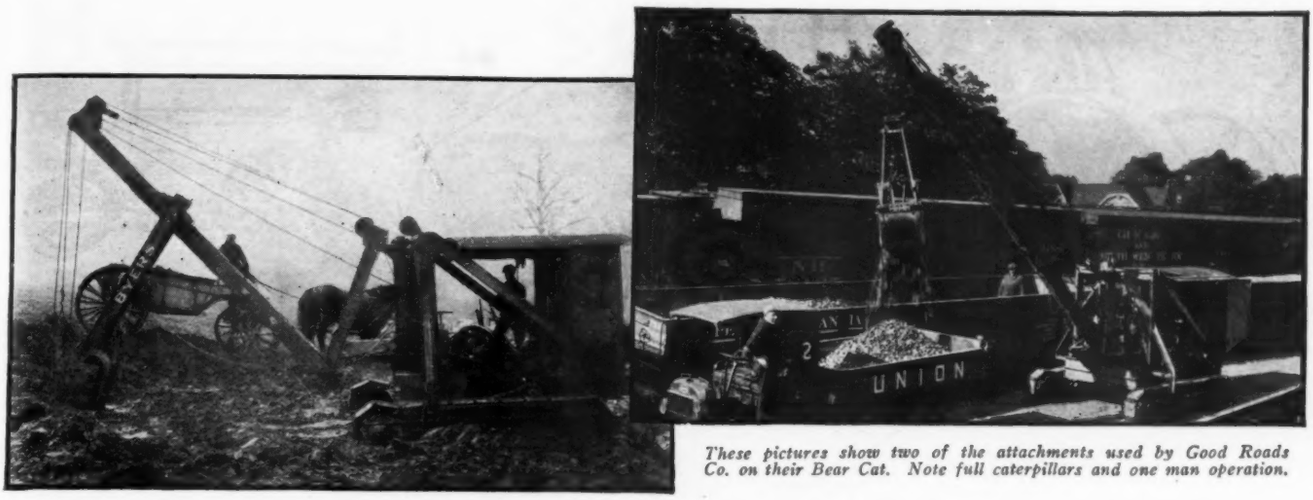
Distributors

Concrete Steel Company

42 Broadway, New York City

Sales Offices and Warehouses in Principal Cities.

HOOSIER



These pictures show two of the attachments used by Good Roads Co. on their Bear Cat. Note full caterpillars and one man operation.

This Bear Cat Owner has Shovel, Ditcher and Clamshell

IT'S "a grand and glorious feeling" to find that you've got more than your money's worth when you buy something.

That's an every day experience with Bear Cat owners. Here's the way it goes. Mr. Contractor buys a Bear Cat for clamshell work, we'll say. It works fine and is all that he expected. Then along comes a nice job of ditching which he could get if he had the machine to handle it.

He remembers that the Bear Cat is called the all-purpose machine, so he orders a ditcher attachment. For only a few hundred dollars additional he has secured equipment that otherwise would have cost him several thousand, and it does the work to perfection.

Good Roads Co. of Philadelphia, whose Bear Cat is pictured above, wrote:

"We now have three attachments for the 'Bear Cat'—the crane, which we used to great advantage last year in unloading cars of stone; the ditcher, which we also used to advantage on a large sewer job; and the shovel attachment. We feel that with these three attachments we are equipped to do practically any kind of work with the 'Bear Cat.'"

Would you like to know more about this economical all-purpose one man machine with full caterpillar mounting?

Write, wire, or send the coupon.

THE BYERS MACHINE COMPANY, RAVENNA, OHIO

Builders also of the Bear Cat Truckrane. Sales and Service Throughout the Country

BYERS BEAR CAT

THE BYERS MACHINE CO.
Ravenna, Ohio.

Gentleman:
Please send me the new Bear Cat Book. The type of work I am particularly interested in is

.....

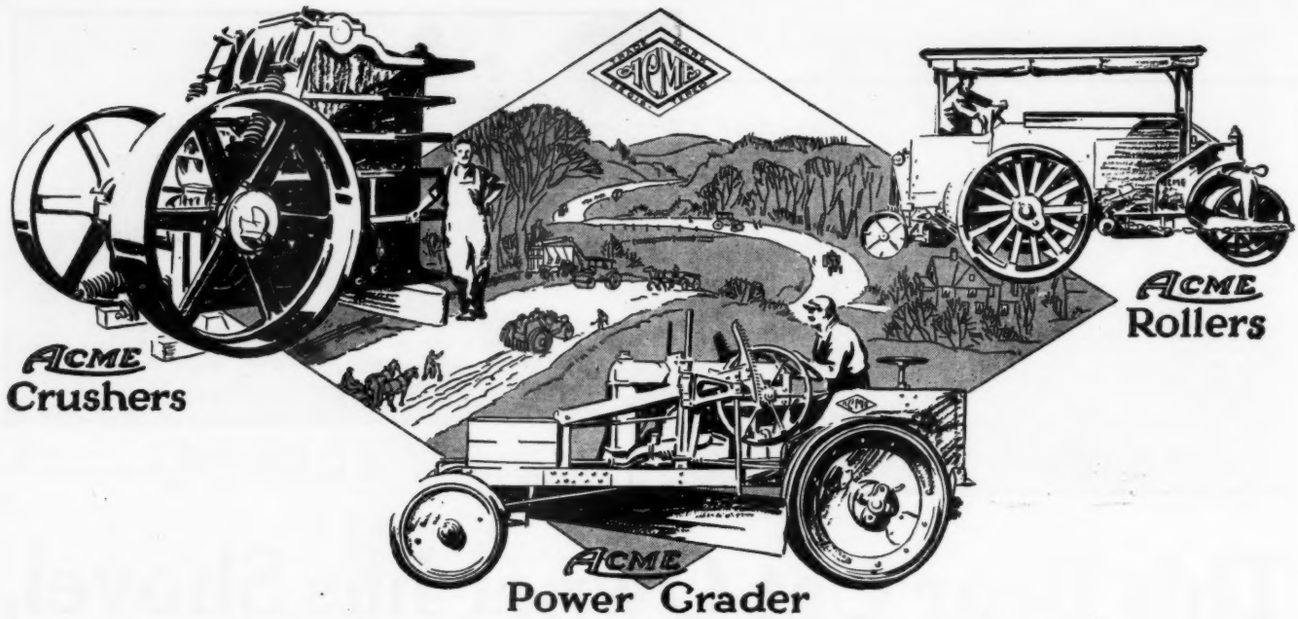
Name .....

Address .....

Town .....

State .....

P. W. 12-15-25



ACME-BUILT ROAD MACHINERY FOR BETTER-BUILT ROADS

Write for Catalog

Listing and describing the complete line of Acme road building machinery, from the fifteen-ton motor roller down to the Acme Nine Tined Special Stone Fork!

Also for Bulletin No. 125

Describing the remarkable Acme Tri-Utility Road Builder, Power Grader, Pony Roller or Scarifier, all with one power plant and interchangeable parts. One-man operated.

WHATEVER your road building job may be, from the first grading operation and crushing of stone to the final rolling of the last surfacing, there is an Acme-built unit for doing it.

Acme's twenty-five years of experience and sound engineering in this field account for the long service Acme road machinery gives and the notable permanence of the roads built with it.

Consequently every purchase of Acme road building equipment has come to reflect credit not only on the machines themselves but also on the judgment of the township official or contractor who buys it.

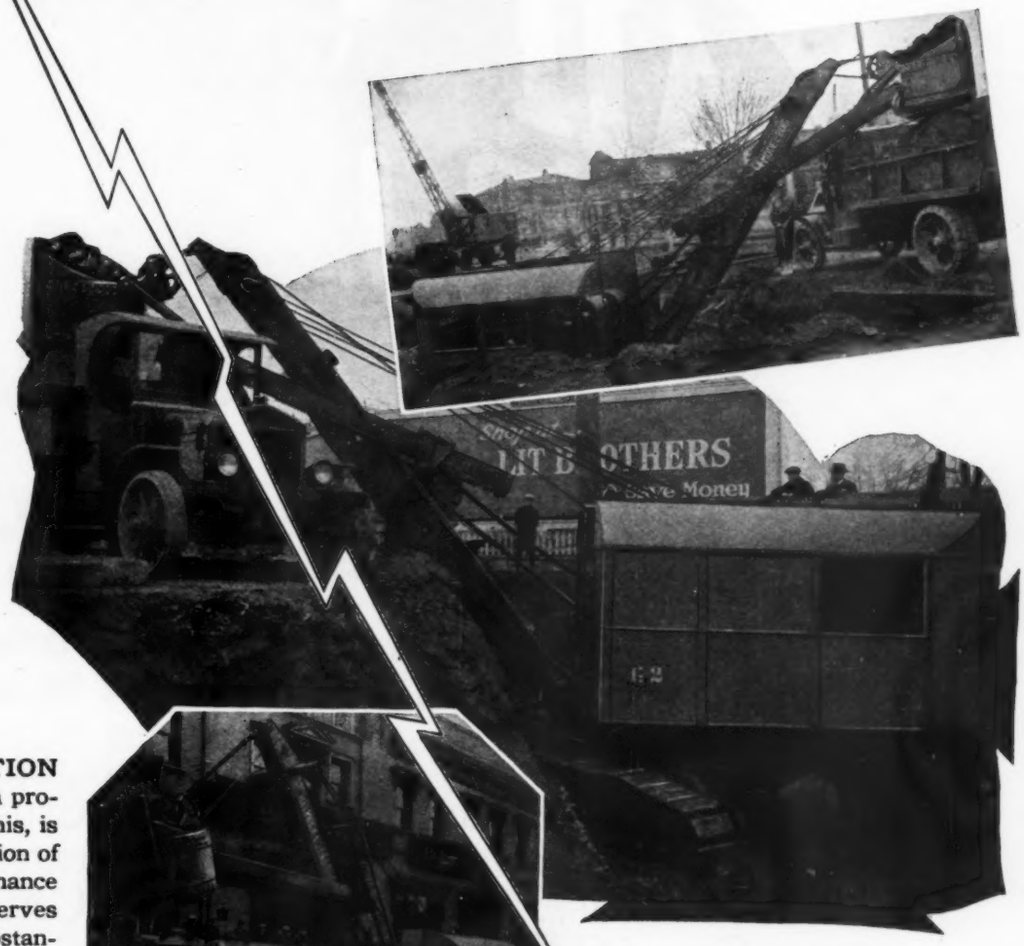
COMPLETE ROAD-BUILDING AND QUARRY EQUIPMENT

MOTOR ROLLERS	CRUSHERS	GRADERS	PULVERIZERS
STEAM ROLLERS	SCARIFIERS	SCREENS	WAGONS
TANDEM ROLLERS	CONVEYORS	ELEVATORS	BINS

ACME ROAD MACHINERY COMPANY EST. 1900. FRANKFORT. N.Y.

Here's the Story By Wire

Digging Philadelphia's Subway



Two P & H Model 206 Gasoline Shovels, owned by Patrick McGovern, Inc., digging the new Philadelphia Subway. No air tool is required for breaking up the concrete and asphalt pavement as this is accomplished with the P & H Shovels. The telegram tells the story of their satisfactory operation. Read it.

A RECOMMENDATION from one user to a prospective user, such as this, is probably the best indication of the satisfactory performance of P&H Shovels. And it serves in a good measure to substantiate every claim we can make for them.

Maximum output, steady operation and real economy due to powerful crowding motion, sturdy construction and low maintenance, are features largely responsible for more P & H Gasoline Shovels being in use than any other make.

Bulletin 82-X gives all the facts. Write for a copy.

CORDUROY

Follow the Corduroy Trail—the "Tread" Mark of the P & H

Form 1206 A

DAY LETTER
NIGHT MESSAGE
NIGHT LETTER

Patrons should mark an X opposite the class of service desired; OTHERWISE THE MESSAGE WILL BE TRANSMITTED AS A FULL RATE TELEGRAM

WESTERN UNION TELEGRAM

NEWCOMB CARLTON, PRESIDENT GEORGE W. E. ATKINS, FIRST VICE-PRESIDENT

NO. | CASH OR CHG. | CHECK | TIME FILED

Send the following message, subject to the terms on back hereof, which are hereby agreed to

4RD C 34 PHILADELPHIA PENN 853A Dec 4 1924

ALLAN SAVILLE INC
RICHMOND VA

WE ARE USING TWO MODEL TWO NAUGHT SIX P AND H SHOVELS EXCAVATING BROAD STREET HERE WE ARE USING THESE MACHINES VERY SATISFACTORILY WITHOUT BREAKING PAVEMENT IN ADVANCE CAN RECOMMEND THESE MACHINES TO YOU

918A PATRICK MCGOVERN INC

HARNISCHFEGER CORPORATION
Successor to
PAWLING & HARNISCHFEGER CO.
Established in 1884
3812 National Avenue, Milwaukee, Wis.

New York	*Chicago*	*Dallas*	*Los Angeles*
Philadelphia	*Kansas City*	*Pittsburgh*	*Seattle*
Birmingham	*San Francisco*	*Portland*	*Minneapolis*
Richmond	*Detroit*	*Memphis*	*Jacksonville*

Warehouses and Service Stations: Philadelphia, Memphis, San Francisco, Los Angeles, Jacksonville, Seattle

P&H GASOLINE SHOVEL
Standard Gasoline Excavator of the World

Portable Power House

30 to 120 H.P. UNIT in its own Weather-Proof, Tamper-Proof House

Just the Power Outfit for Hoists, Sand and Gravel Pumps, Mud Pumps, Crushers, Grinders, Operating Generators, Saw Mills, Lumber Operations, Cotton Gins, Oil Well Drilling, etc.

—Move where you wish
—Fasten down quickly and securely anywhere
—Connect with Belt, Gear or Flexible Coupling
—Always ready for use
—Sides close and lock with padlock, leaving only crank and power pulley exposed

Write for Special Bulletin describing

SUCCESSFUL PERFORMANCE GUARANTEED

CLIMAX

Trade Mark Reg. U. S. Pat. Off.

The "Trustworthy" Power Unit

CLIMAX ENGINEERING CO., 57 W. 18th Avenue, Clinton, Iowa

Also Builders of Climax Refrigerating Units

Los Angeles, Calif.: Coast Machinery Corp., 454-66 E. 3rd St.
Chicago Branch: 2007 Harris Trust Bldg., Chicago, Ill.
Eastern Branch: 30 E. 42nd St., New York, N. Y.
Cleveland Branch: 657 Leader Bldg., Cleveland, Ohio
Denver, Colo.: The Hendrie & Bolthoff Mfg. & Supply Co., 1621-39 17th Street

Sales Agents Wanted *We have a very attractive proposition for agents in territory not now covered. If you can sell our Portable Power Unit, write us for full details. No obligation on your part in asking for information.*

23

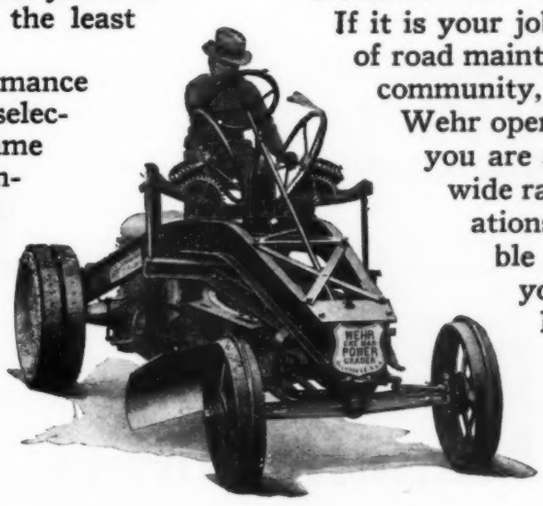
This splendid fleet of Wehr One Man Graders was sold to the New York State Highway Department by the Peck Motor Co., Fordson Dealers, Hornell, N. Y., and W. B. May, Inc., Buffalo, N. Y., authorized Fordson equipment distributors.

WEHR The "Original" One Man GRADERS
Fordson Power

—purchased at one time, are now working for the New York State Highway Department

AFTER test upon test; after a careful comparison with all other makes of both drawn and power graders, and from its previous experience with a number of Wehr Graders, the New York State Highway Department settled upon the Wehr One Man Grader as its final choice of a road maintaining unit that would do the best job over the longest period of time, at the least cost per mile.

The important factors of performance and economy which led to this selection of the Wehr are the same important factors which are winning the support and approval of highway engineers and state and county highway commissions throughout the country. The Wehr One Man Grader is making good on the New York highways in the same big way that it is making good wherever it is in use. Taxpayers, and those who are responsible for the actual selection of the equipment, are fast coming to realize that it is an economic waste to do road-building and road-mending with drawn equipment when the Wehr will do five times as much for the same cost.



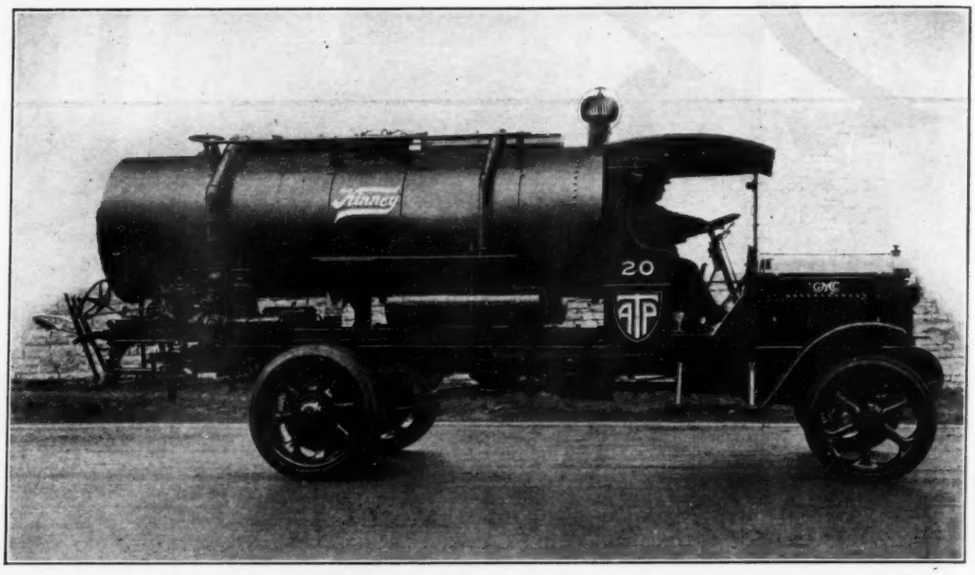
If it is your job to assist in the selection of road maintaining equipment for your community, the economical phase of Wehr operation will interest you. If you are a highway contractor, the wide range of road building operations which the Wehr is capable of handling, will merit your serious consideration. In either event, write for literature describing this good unit in detail.

WEHR COMPANY

559 30TH STREET MILWAUKEE, WISCONSIN

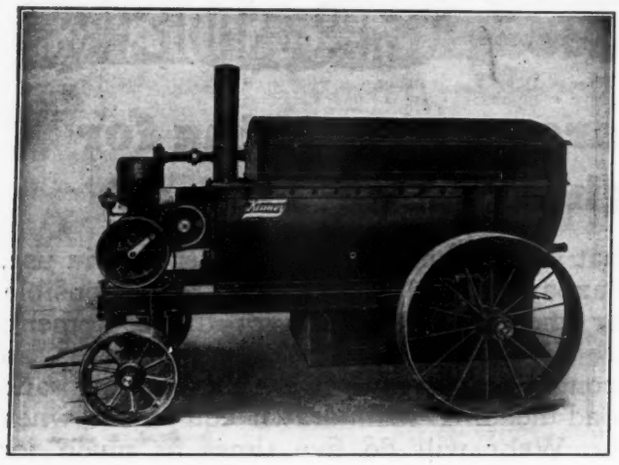
TRADE MARK
Kinney
REG. U.S. PAT. OFF.

Time Labor and Money Savers



The Kinney Heater and Distributor

Meets all specification requirements. Guaranteed to sufficiently heat and properly apply all varieties and grades of bituminous material for road construction and maintenance.



The Kinney Handy Heater and Sprayer

Especially Adapted for Road Maintenance, Construction and General Repair Work

Contents thoroughly agitated while heating. No burning or coking of material. Pump, Piping, Hose, Nozzles, Automatically Heated. No Steam Required.

The TRADE MARK Kinney REG. U.S. PAT. OFF.

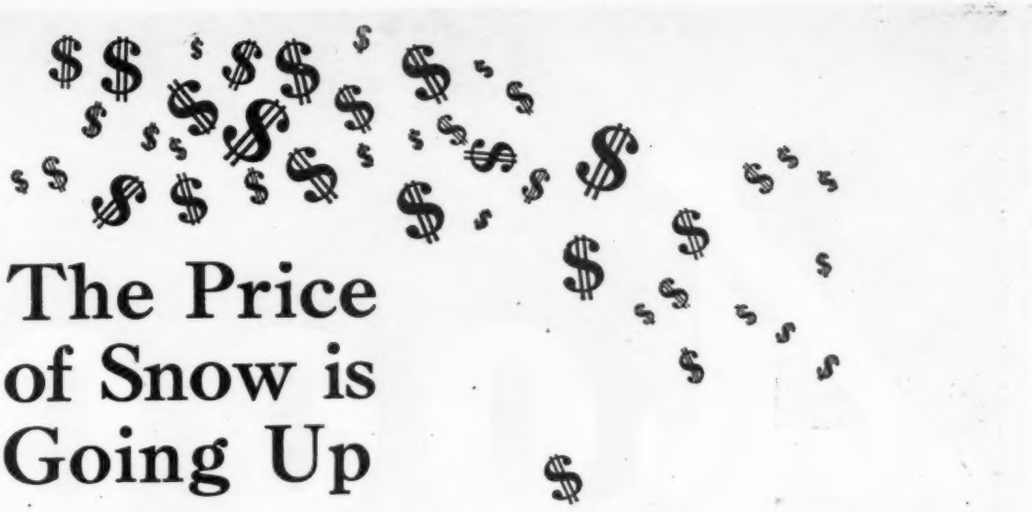
STEAM JACKETED PUMP

The Standard of efficiency for pumping Heavy Crude Oils, Asphalts, Tars and all heavy viscous or bituminous products.

Kinney Manufacturing Company

BOSTON, MASS.

New York *Philadelphia* *Chicago* *Houston* *Kansas City* *San Francisco*
Philippine Islands *Porto Rico* *Cuba* *Hawaiian Islands*



The Price of Snow is Going Up

Every year, the price of snow goes up, for every year, we become more and more dependent upon our automobiles and our streets for transportation. To cripple that transportation, as a snow storm does, entails a high loss to the business of the town.

Any of your merchants will tell you this. Any of your constant auto users will back them up.

To keep your streets clear of snow with hand labor means high costs. Perhaps, that is why your city has had to content itself with "single track" streets—opened only by a single lane along their centers.

Barber-Greene Snow Loaders make clear streets possible each winter without entailing high hand labor costs. A single Barber-Greene can often replace as many as 200 shovelers. It can often clear a stretch in fifteen minutes that a shovel gang could not clear in four hours.

It can make truck loading a touch and go affair. It can make a fewer number of trucks do more work. And in the summer, the Barber-Greene can be converted into an efficient bucket loader to handle a hundred and one odd jobs about a town.

There, briefly, are the reasons why other cities all over the snow sections are turning to Barber-Greenes. The price of snow is going up, and they refuse to pay it.

What they are doing is shown in our latest snow removal booklet by actual pictures and data. Send for a copy.

A Barber-Greene working after a heavy snow storm in Manchester, New Hampshire.

BARBER-GREENE CO. 635 W. Park Av., Aurora, Ill.
Representatives in Fifty Cities

BARBER GREENE

Portable Belt Conveyors Self Feeding Bucket Loaders
Coal Loaders . . . . . Automatic Ditch Diggers . . . . . Coal Feeders

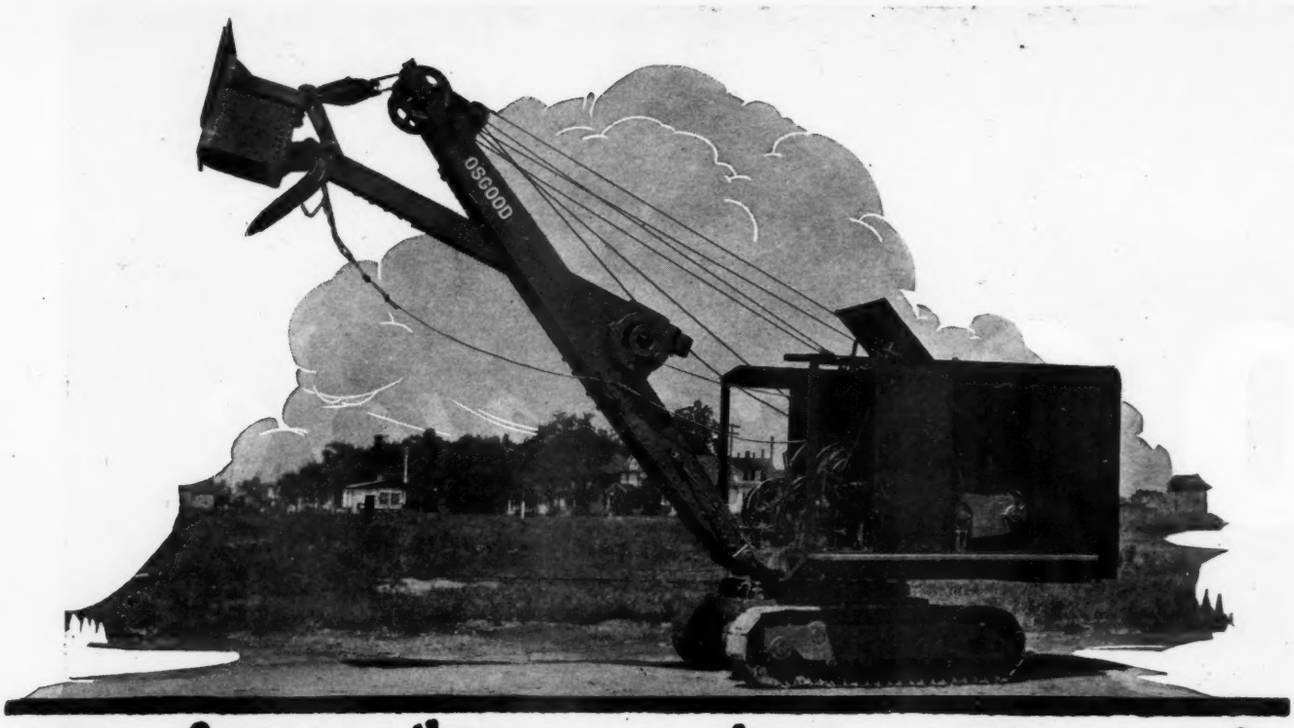
4,000,0

of Ky

~ in

...000 sq. yds.
...rock
nineteen-twenty-five

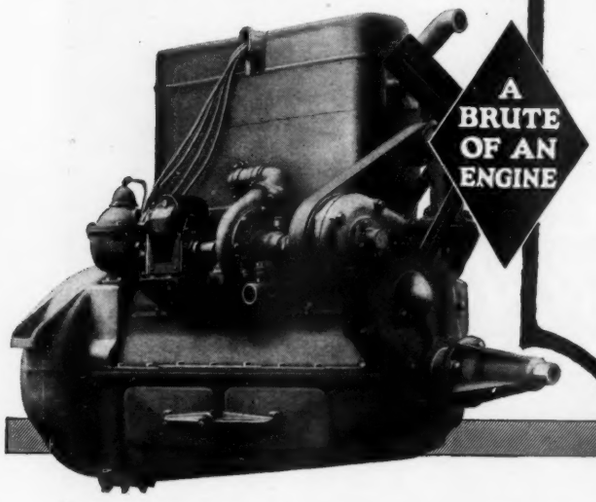
KENTUCKY ROCK
ASPHALT CO. Inc.
Marion E. Taylor Bldg.
LOUISVILLE, KENTUCKY



Built to "Power" the Best!

Brute Strength for Heavy Duty
YOU'LL FIND
OSGOOD POWER SHOVELS
BEAVER POWERED

The Beaver Engine is made in sizes ranging from 25 to 150 H.P. It has a force-feed lubricating system which is foolproof and trustworthy. And all working parts are made big to insure long life. The Highest engineering standards strictly followed; every detail of the Beaver makes for ruggedness, strength, and enduring service.



The contractor who buys "quality" construction equipment because he knows it is cheapest in the long run, should insist on Beaver Engines for his machines because then he is assured beforehand of an unfailing source of dependable power.

The manufacturer who prides himself on building "quality" equipment should select a "quality" engine—the Beaver—because it will measure up to the high engineering standards of his product.

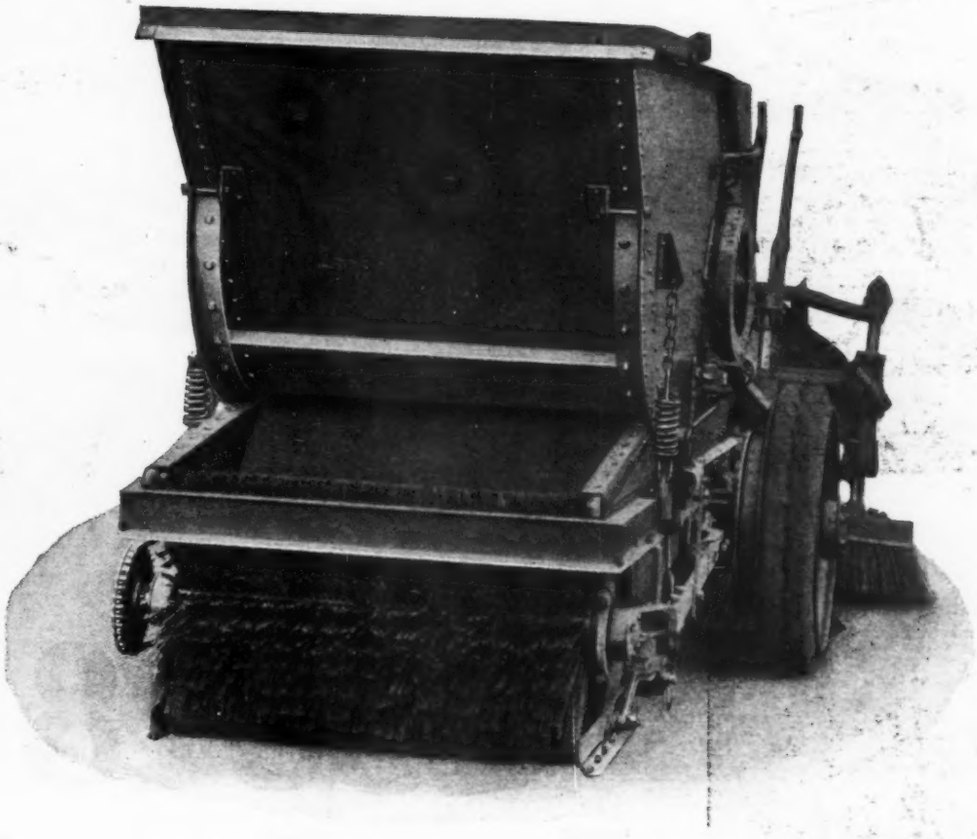
Beaver Engines furnish dependable power to all types of heavy duty construction equipment, concrete pavers, trench diggers, cranes, hoists, power shovels, excavators, and other power operated machinery.

When you buy heavy duty equipment, insist on the Beaver Engine, it means greater yardage, day in and day out.

Write for circulars, describing Beaver Industrial Engines in detail.

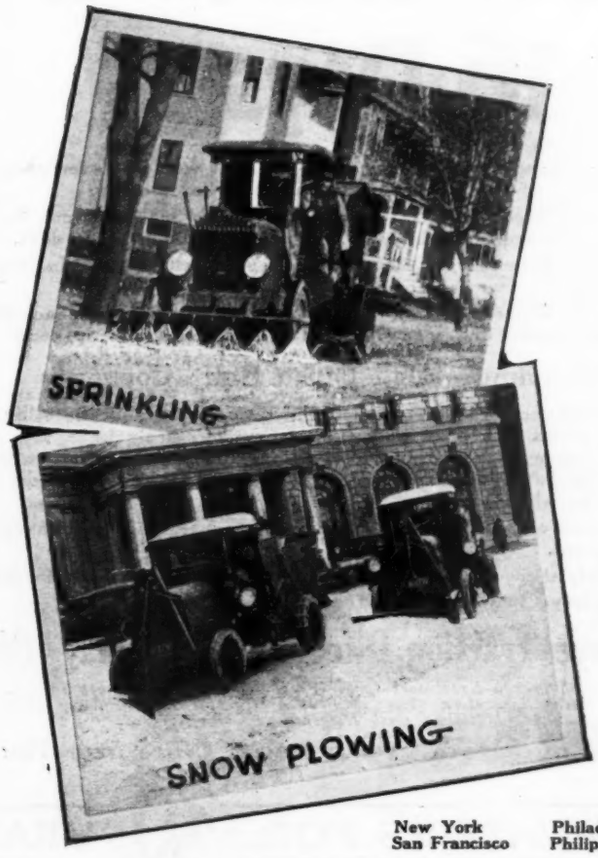
BEAVER MANUFACTURING CO.
36 25th St., Milwaukee, Wis.

FOR STEADY SERVICE
Beaver



for the most satisfactory and economical upkeep of city streets

TRADE MARK
Kinney
REG. U.S. PAT. OFF.



SPRINGFIELD MOTOR SWEEPER

No other device will clean pavements at so low a cost per square yard.

It not only removes the litter from the gutters and street surfaces but at the same time actually loads it into the carrying body of the sweeper and discharges it at any point desired. May be used to good advantage as a snow plow. Equipped with a Sprinkler System and a water tank of 150 gallons capacity.

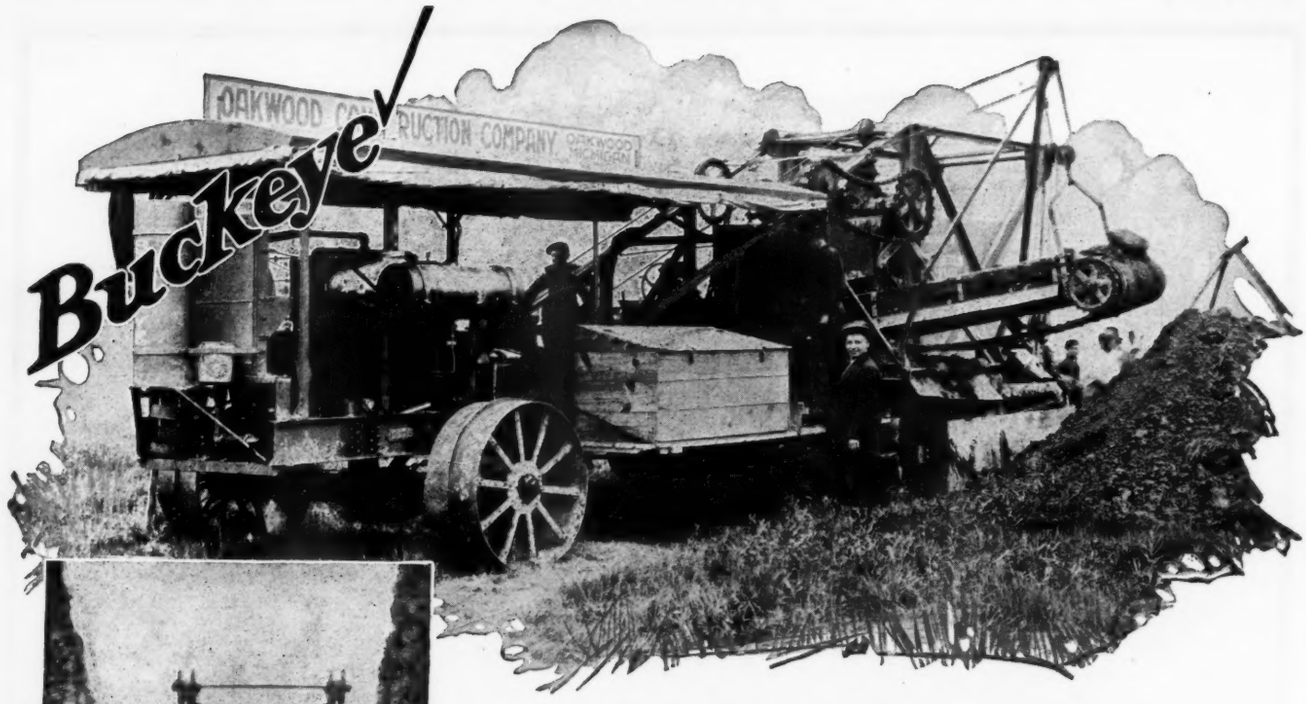
Equipped with complete lighting outfit and Bosch generator for night sweeping. A machine of the highest mechanical construction, durability and efficiency. The five brooms have independent adjustments to conform to curvatives in the road.

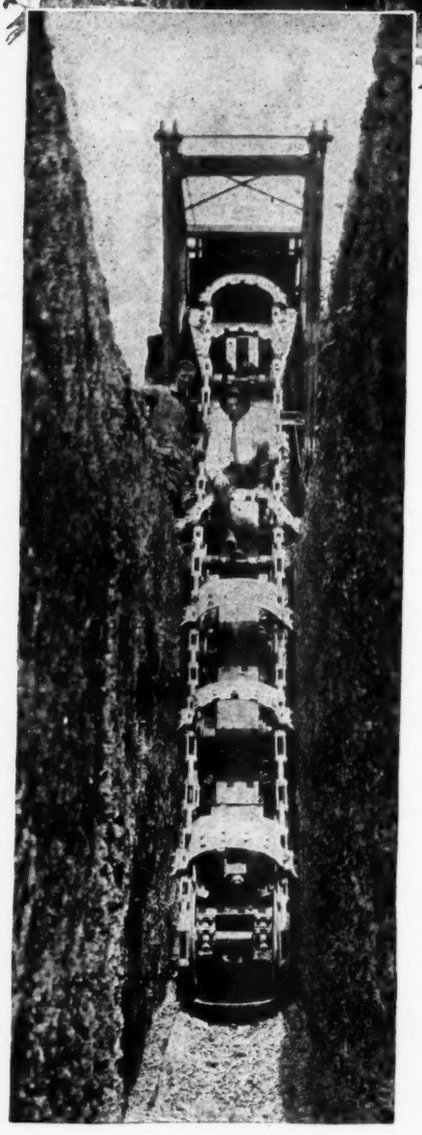
SWEEPS IN A THOROUGH MANNER

Write for new catalogue showing complete detail of equipment

KINNEY MANUFACTURING CO.
BOSTON, MASS.

New York San Francisco Philadelphia Philippine Islands Chicago Porto Rico Houston Cuba Kansas City Hawaiian Islands





23828

Feet of Trench in 16 Days

If labor were cheap, digging trench with Buckeyes would be even cheaper, says Hugh McLean, of the Oakwood Construction Co., Detroit.

They own two Buckeyes. On one job these two machines cut trench 12 to 24 in. wide, average 11 ft. deep, to the tune of 16,084 ft. in 11 days.

And then, on a different job they finished 7,744 ft. of 12 to 24 in. trench, average 12 ft. deep, in five days.

Average per Buckeye, per day, 744 ft. And both jobs were back-filled with one Buckeye Back-Filler a few days after the trench was opened.

Easy Handling—High Quick Shift Conveyor

General construction, the high Quick Shift Conveyor and the Alligator Traction, alone, would make the most critical man buy a Buckeye, says Mr. McLean. The conveyor not only handles *all* kinds of materials without spilling or slipping, but it is high enough so that dirt can be loaded direct into wagons and trucks when necessary.

Good men, good organization and good machines make high daily averages year in and year out.

We can supply the good machines for trench excavation and back-filling. Ask any Buckeye owner—or send for the Buckeye booklets.

The Buckeye Traction Ditcher Co., Findlay, Ohio

Manufacturers of Trench Excavators (both Wheel and Chain-and-Bucket Types), Pipe-Line Trench Excavators, Tile and Open Ditchers, Back-Fillers, Pipe Screwing Machines, Curb Diggers and Clay Diggers.

There's a Buckeye Sales and Service Office Near You

BUILDERS OF TRENCH EXCAVATORS FOR 30 YEARS

Move More Dirt Per Man

TAKE two or three men to a grading job and move 500 yards of dirt a day. The labor problem will not worry you then. This is being done with single trains of Baker Maney Self-loading Scrapers. Five men and two trains can move over 1000 yards a day. Moving more dirt per man has made Baker Maneys the standard dirt-mover for road contractors.

COUNTY road officials are finding a good way to use Baker Maneys. They carry one or two of them along with their big tractor and blade grader, unhitching the grader and putting on the scrapers when removing surplus dirt from high spots, using the same men. Odd jobs can thus be cleaned up as you go. No extra men needed. Road officials should know more about this method. Ask us for details.

EXHIBITED AT
ROAD SHOW
CHICAGO
Jan. 11-15, 1926
Space N.C. 6

All about Baker Maneys in our big catalog. Send for it.

The BAKER MFG. CO., 525 Stanford Ave., Springfield, Illinois

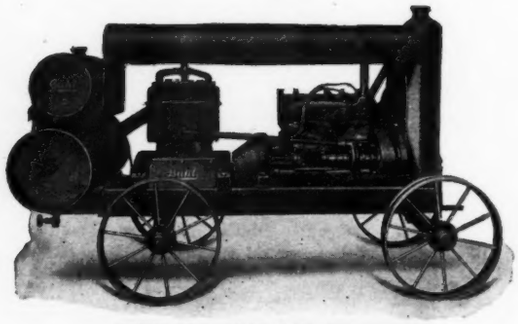
BAKER MANEY
Self Loading Scrapers

Model D—1¼ cu. yd. Model H—¾ cu. yd.

Buhl

AIR COMPRESSORS

BUHL Type 90-C
Capacity 90 cu. ft. per min.
Also furnished in 55 ft. cap.



BUHL Type Y Portable Compressor
Furnished in 115-160 cu. ft. capacities.

A "BUHL" Compressor With the Proper Tools Will Increase Your Profits!

Old time methods will not meet present day competition—if you are still using the pick and shovel method, investigate how compressed air can be efficiently applied to your job.

There is a BUHL compressor for every purpose—a variety of sizes and types for rock drilling, riveting, sand blasting, tamping, digging, etc. Investigate and you will buy a BUHL.

BUHL Type 120-FD
Compressor Fordson Tractor
Capacity 100 cu. ft. per min.

Send for Bulletin and full descriptions TO-DAY.

ANNUAL CONVENTION AND ROAD SHOW
AMERICAN ROAD BUILDERS ASSOCIATION
JANUARY 11-12-13-14-15
1926
CHICAGO, ILL.

The Buhl Company

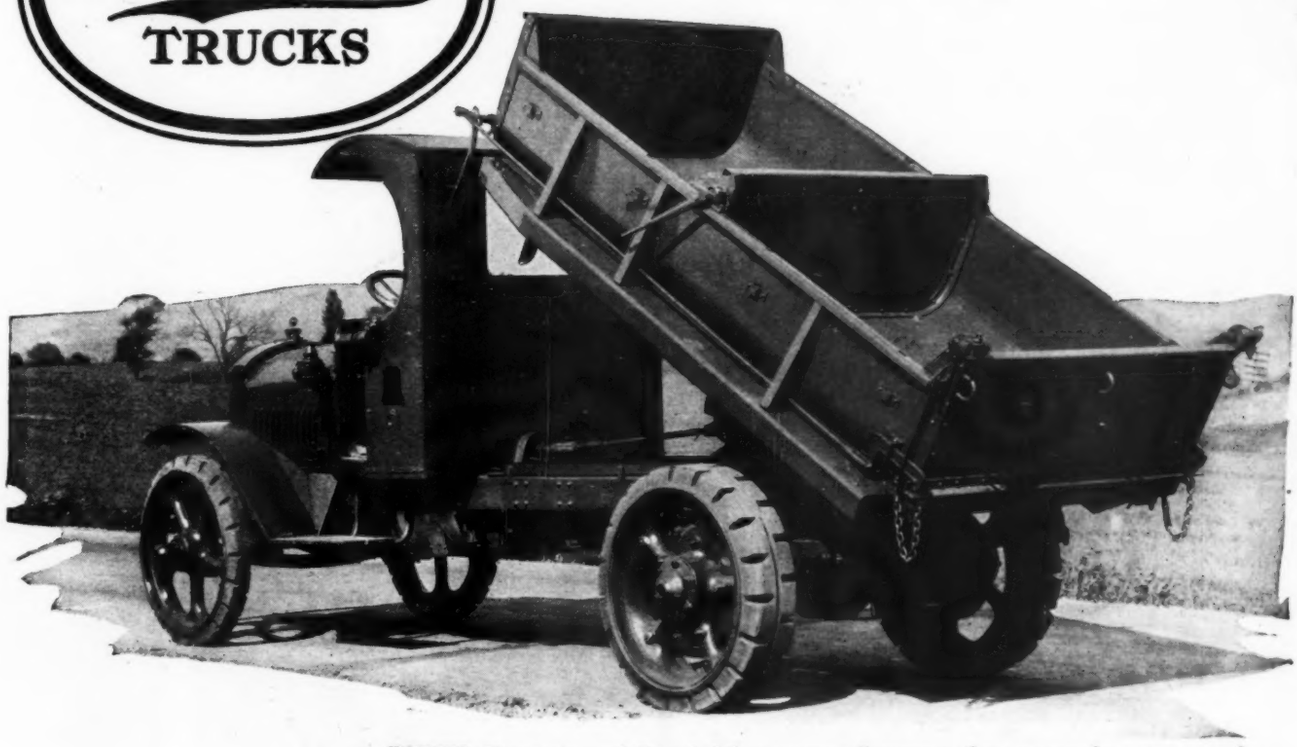
MANUFACTURERS

General Offices—37 W. Van Buren St.
CHICAGO

New York : Philadelphia : Pittsburgh : St. Louis

REG. U.S. Mack PAT. OFF. TRUCKS

An All Purpose Mack Dump Truck



THE Contractors' Special has many features that strongly commend it to experienced road builders, contractors and engineers.

Its demountable cab top, low body sides and underbody type of hoist combine to reduce the overhead clearance to a minimum—a decided advantage where hoppers are low.

The body is slightly wider at the rear than at the front. Where the bottom and sides meet, the edges are rounded, the interior finish is smooth and the angle of the hoist is high, giving a free and easy discharge of either wet or dry materials. The spreader chain equipment regulates the tail gate opening allowing an even distribution when unloading.

Made from No. 7 gauge sheet metal, this body is both welded and riveted together. Steel running boards along both sides of the subframe act as an additional reinforcement and body guard. The tail gate is double-acting with manual control. Standard equipment provides one removable swinging partition. Additional partitions furnished and installed at a small extra charge.

With a water level capacity of 72 cu. ft., the use of sufficient removable partitions allows the handling of the following batch loads:

Two 5-bag batches of dry mixture
Three 4-bag " " " "
Four 3-bag " " " "

The chassis and motor are Mack-built throughout. This Contractors' Special embodies Mack strength, Mack endurance and Mack low ton mile costs, the result of twenty-five years of specialization.

The MACK Line

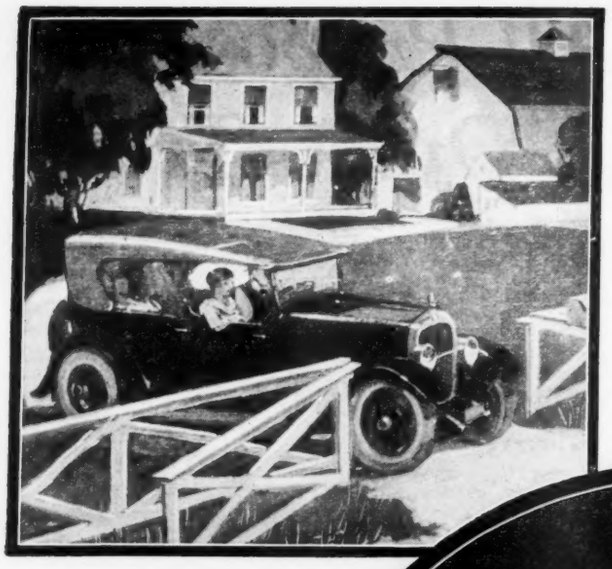
Road Tractors
Dump Trucks
Oilers
Gasoline Railroad Equipment
Special Ash and Garbage Truck
Road Sprinklers
Catch Basin Cleaners
Fire Apparatus
Wrecking Trucks
Semi-Trailers
Flushers
Special Farm Trucks
Motor Buses
Armored Trucks

Write for detailed description of this or any type of Mack for economical highway transport service. Inspect the Mack exhibit in space A-3 in Coliseum Annex at Seventeenth National Good Roads Show, Chicago, Jan. 11th to 15th inclusive.

MACK TRUCKS, Inc.
INTERNATIONAL MOTOR COMPANY
25 Broadway New York City

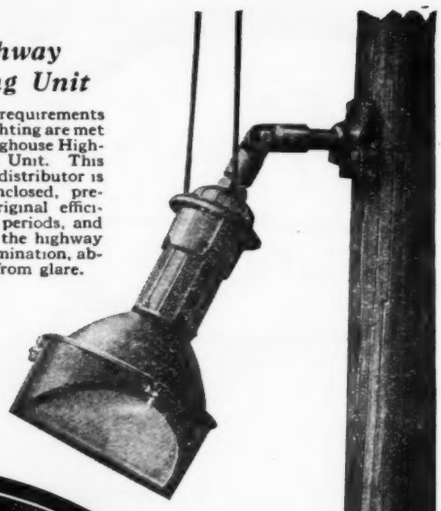
Ninety-five direct MACK factory branches operate under the titles of: "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION," "MACK MOTOR TRUCK COMPANY," and "MACK TRUCKS OF CANADA, LTD."

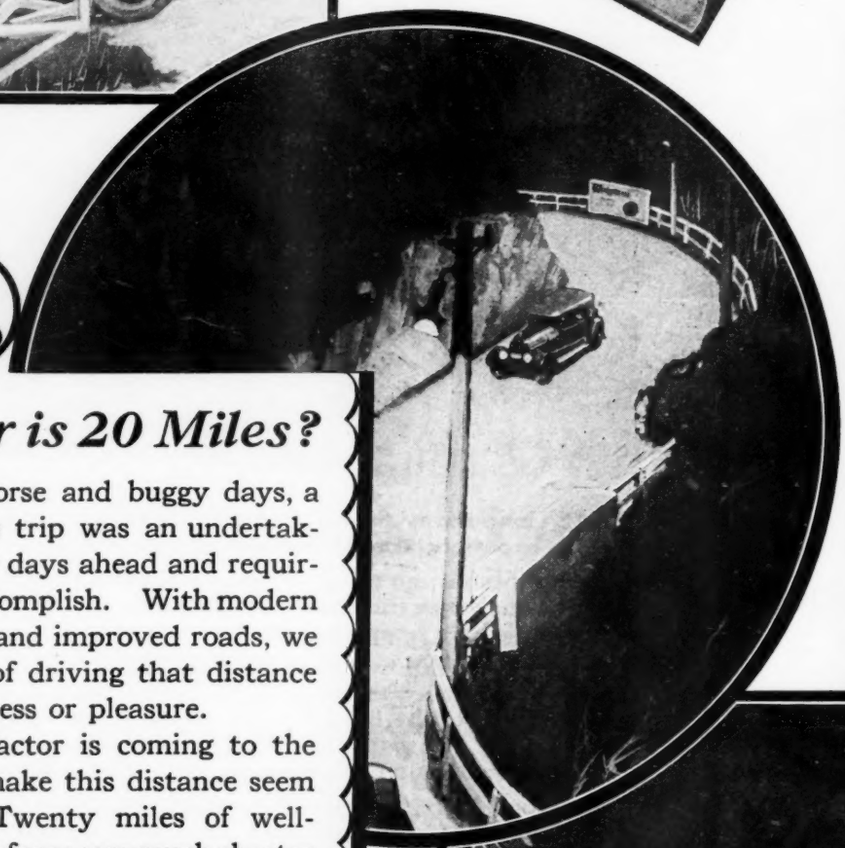
PERFORMANCE COUNTS



Highway Lighting Unit

The essential requirements of highway lighting are met by the Westinghouse Highway Lighting Unit. This durable light distributor is completely enclosed, preserving its original efficiency for long periods, and producing on the highway a uniform illumination, absolutely free from glare.





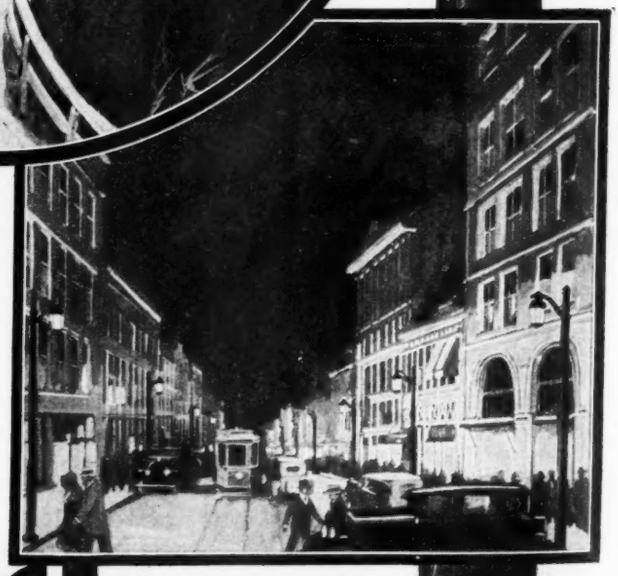
How Far is 20 Miles?

IN the old horse and buggy days, a twenty mile trip was an undertaking planned for days ahead and requiring hours to accomplish. With modern transportation and improved roads, we think nothing of driving that distance either for business or pleasure.

But a new factor is coming to the fore that will make this distance seem still smaller. Twenty miles of well-lighted thoroughfare seem much shorter than the same distance of dark country roads.

A path of light from the farm to town will bring the farmer closer to his market and to those pleasures that can only be found in populous districts.

Westinghouse Electric & Manufacturing Company
George Cutter Works South Bend, Indiana
Sales Offices in All Principal Cities of
the United States and Foreign Countries



Westinghouse

X84581

Adams 10 ft. Grader finishing a ditch bank by making a heavy cut with the Back Sloper, Front wheels leaned to offset side pull of Back Sloper. Rear wheels leaned to hold machine against the heavy cut.

Why YOUR Grader Should Be An ADAMS

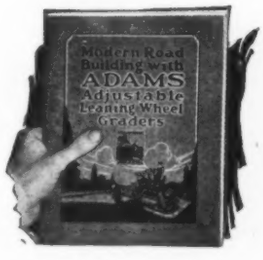
First, Your grader should be a "Leaning Wheel" grader because—this is the only type of grader that is designed correctly to move earth sidewise. A "Leaning Wheel" grader pulls easier, does not skid or drag, is easier to control, does better work and much more of it per dollar than any straight-axle grader.

Second, Your "Leaning Wheel" grader should be an **Adams** because only in an Adams do you get the proved performance and absolute satisfaction, which are the results of Adams 40 years of specializing on "Leaning Wheel" graders.

During these 40 years, Adams Graders have been perfected to a degree of simplicity, strength, ease of operation and freedom from trouble, not approached by recent imitations. For example, compare the simple patented "one-piece" rear axle of Adams Graders with the "two-piece" axles and complicated controls used on other "Leaning Wheel" graders.

Any way you figure it—on design, construction, performance or satisfaction—your best buy in a road grader is an ADAMS. Ask any user—and send for a copy of our 60-page catalog.

See the exhibit of ADAMS Graders at CHICAGO Road Show Space 27 Coliseum



ADAMS
ADJUSTABLE LEANING WHEEL
GRADERS

"The Original – A Proved Success Since 1885"

P.W.-12

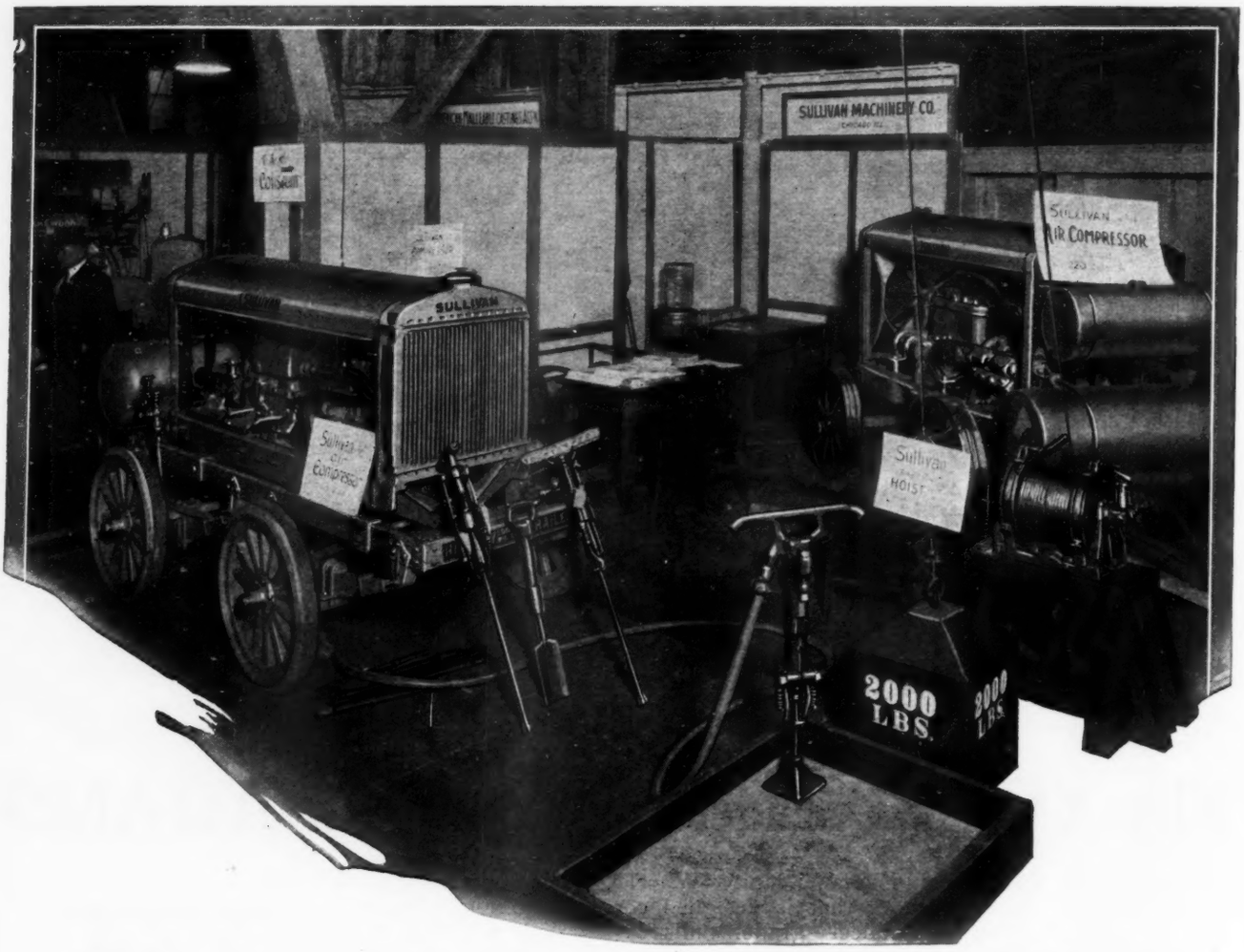
J. D. ADAMS & CO.,
Indianapolis, Ind.

Send me a copy of your catalog.

Name .....

Position .....

Address .....



Bringing the Road Show to You

By all means come to Chicago for the Road Show! It will be well worth your time and expense to see and study this splendid display of modern road building methods and equipment.

This is your invitation to visit the Sullivan booth (W-9, 10, West aisle, South, Main Coliseum), and to inspect the exhibit of new

SULLIVAN ROAD EQUIPMENT

But if you can't come, this page will help to bring the Sullivan exhibit to you. The photo shows our booth last year.

This year visitors will see:

3 Sullivan Portable Air Compressors, "WK-312," 110-ft. on trailer truck (left in the picture); "WK-314," 220-ft. balanced "V" type (right in the picture); "WG-6," motor driven, on skids.

IN OPERATION

2 types of new Concrete Breakers, "DW-221," 75-lb. heavy duty; "DB-221," 48-lb. light buster. "Rotator Hammer Drills," Pneumatic Clay Spaders, Turbinair Portable Hoists (right in the picture). Sullivan New Drill Sharpener, Type "C," 1100 lbs., especially designed for contractors' use, portable, powerful, compact, accurate.

Plan now for next season. Ask us for the catalogues.

DOMESTIC SALES OFFICES

Birmingham, Boston, Butte, Claremont, N. H., Cleveland, Dallas, Denver, Duluth, El Paso, Huntington, W. Va., Joplin, Juneau, Knoxville, New York, Pittsburgh, St. Louis, Salt Lake, San Francisco Spokane.

SULLIVAN TRADE MARK

MACHINERY COMPANY

138 So. Michigan Ave. Chicago.

FOREIGN SALES OFFICES

Algiers, Brussels, Calcutta, Christiania, Durban, Natal, Havana, Lima, London, Madrid, Mexico City, Paris, San Juan, Santiago, Shanghai, Sydney, N. S. W., Tokyo, Toronto, Tunis, Turin, Vancouver

WHY DETROIT SELECTED ASPHALT FOR THE WORLD'S GREATEST MUNICIPAL PAVING PROGRAM

That greatest automobile center of the world, the City of Detroit, lately expanded by the annexation of 1,190 miles of new streets, is now at work on the greatest paving program ever undertaken by any city in the world.

Detroit's 1925 street program embraced the paving with asphalt of 689 different streets, totaling 213 miles in length at a cost of $18,719,000.

Read the following, prepared for the guidance of the city officials by the Detroit Bureau of Governmental Research:

"The reasons for the use of asphalt are many and the objections to its use are comparatively few. The principal objection from the economic standpoint has been the fact that for many years the natural asphalt output has been controlled and competitive bidding has been a form only. The opening of city specifications to oil asphalts has changed this situation.

"The advantages are the ease of laying and ease of repair; the durability of the wearing surface; the ease of cleaning; its water-shedding qualities; its comfort as a surface for riding; its dustlessness, and its comparative cheapness. The esthetic sensibilities, a consideration in regard to urban pavements, are not wounded by the repairs to an asphalt pavement, which cannot be said of most of the others. There is no glare. All in all, the most satisfactory medium for modern traffic is found in this pavement."

More than 12,000,000 square yards of asphalt pavements, in this great Wayne County, Michigan, metropolis, have been successfully sustaining, at low cost for maintenance and during a comparatively long life, the heaviest motor traffic in any city of the size in the world.

FOLLOW THE EXAMPLE OF DETROIT AND PAVE WITH ASPHALT

Write for free standard specifications and complete information.

THE ASPHALT ASSOCIATION

441 Lexington Avenue **New York City**

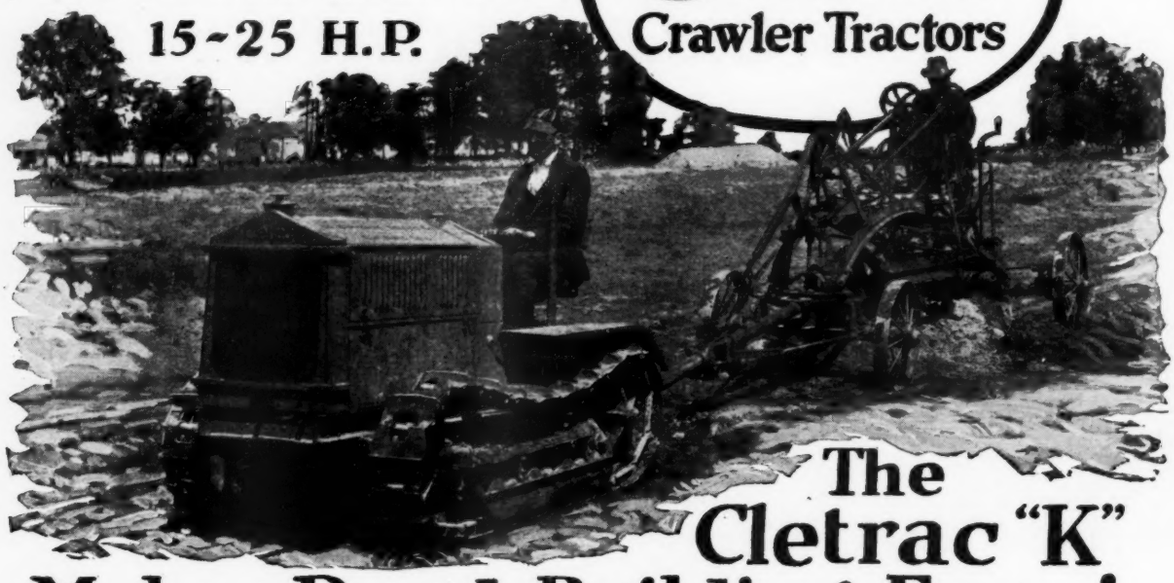
Albany, N. Y. Chicago, Ill. Charlotte, N. C. Kansas City, Mo. New Orleans, La.

Announcing

New Model "K"

15-25 H.P.

Cletrac
Crawler Tractors



The Cletrac "K" Makes Road Building Easy!

EASILY pulling an 8-foot grader—***with full bite***—this new model Cletrac gives road builders abundant power for the hardest jobs. Sturdily built for years of dependable service, it represents the utmost in tractor value. For all types of road and grading work, it reduces operating costs and shortens the time required for each job.

See the Cletrac at
The National Road Show
Chicago, January 11th-15th

The Cletrac "K" is designed to furnish the greatest possible amount of usable power. With weight low down, its broad tracks grip without slippage, giving increased power at the draw-bar. It turns practically within its own length. All rocking motion is eliminated by seven closely assembled track wheels. Crawler tracks are quickly adjusted by "take-up" with a regulating screw.

Model "K" Cletrac is the only tractor made that can be ***oiled while running.*** One push of a hand plunger and the lower track wheels are thoroughly oiled without stopping the machine—a feature that adds extra hours to every working day.

Call at the Cletrac Exhibit at the show—or write
for complete details and descriptive folder.

THE CLEVELAND TRACTOR COMPANY
CLEVELAND, OHIO

for the Road Builder—

"SCHRAMM" Portable Air Compressors

A STEADY, constant air pressure is required on your pneumatic tools if you are going to get the most profit out of your road job. And that is just what the "SCHRAMM" Multi-Cylinder Compressor furnishes. Driven by the big, powerful, 4-cylinder Buda motor, the "SCHRAMM" Compressor furnishes a surplus of air at all times. It is never necessary for the tool operator to wait for pressure to build up.

On the "SCHRAMM" it is not necessary to start the engine against full load. The clutch takes care of that. You start the engine easily on the first turn and then throw on the compressor load.

The 120 cubic foot compressor with a piston displacement of 25 per cent more and 100 per cent more power than on ordinary compressors of this type, costs you no more than others without these features.

Conveniently located stocks throughout the country make it possible to offer you a free demonstration on your job, to prove that the "SCHRAMM" Compressors offer you more air per dollar of investment and upkeep than any other compressor on the market. Write for full details or see them at the Road Show in Booth S-7.

SCHRAMM, INC.
WEST CHESTER, PA.

54 Dey Street NEW YORK | 549 W. Washington Street CHICAGO | 331 Fourth Avenue PITTSBURGH | 709 Arch Street PHILADELPHIA

SCHRAMM

THE Vibrolithic METHOD

Paving America With Vibrolithic

Construction of the first Vibrolithic pavement, back in 1911, marked a new epoch in pavement history. The merits of The Vibrolithic Method were quickly recognized. Rapid progress followed. Today the Vibrolithic organization is represented by 23 sales offices, actively covering 38 states and Canada.

Vibrolithic growth is based on merit—over a period of 14 years, 43 per cent of our business has come from localities that had previously used Vibrolithic. Salesmanship may land the first order, but repeat purchases are based on experience with the article itself.

Notwithstanding the rapid expansion of our organization into new territory during the last three years, 63 per cent of the 1925 yardage is repeat business (an increase of 20 per cent over the 14-year average); over 12 per cent is in newly-developed territory and approximately 25 per cent in new communities, located in territory where Vibrolithic previously had been laid.

In other words, Vibrolithic is enjoying an excellent "repeat" business, healthy expansion in new territory and adding many new localities in developed territory.

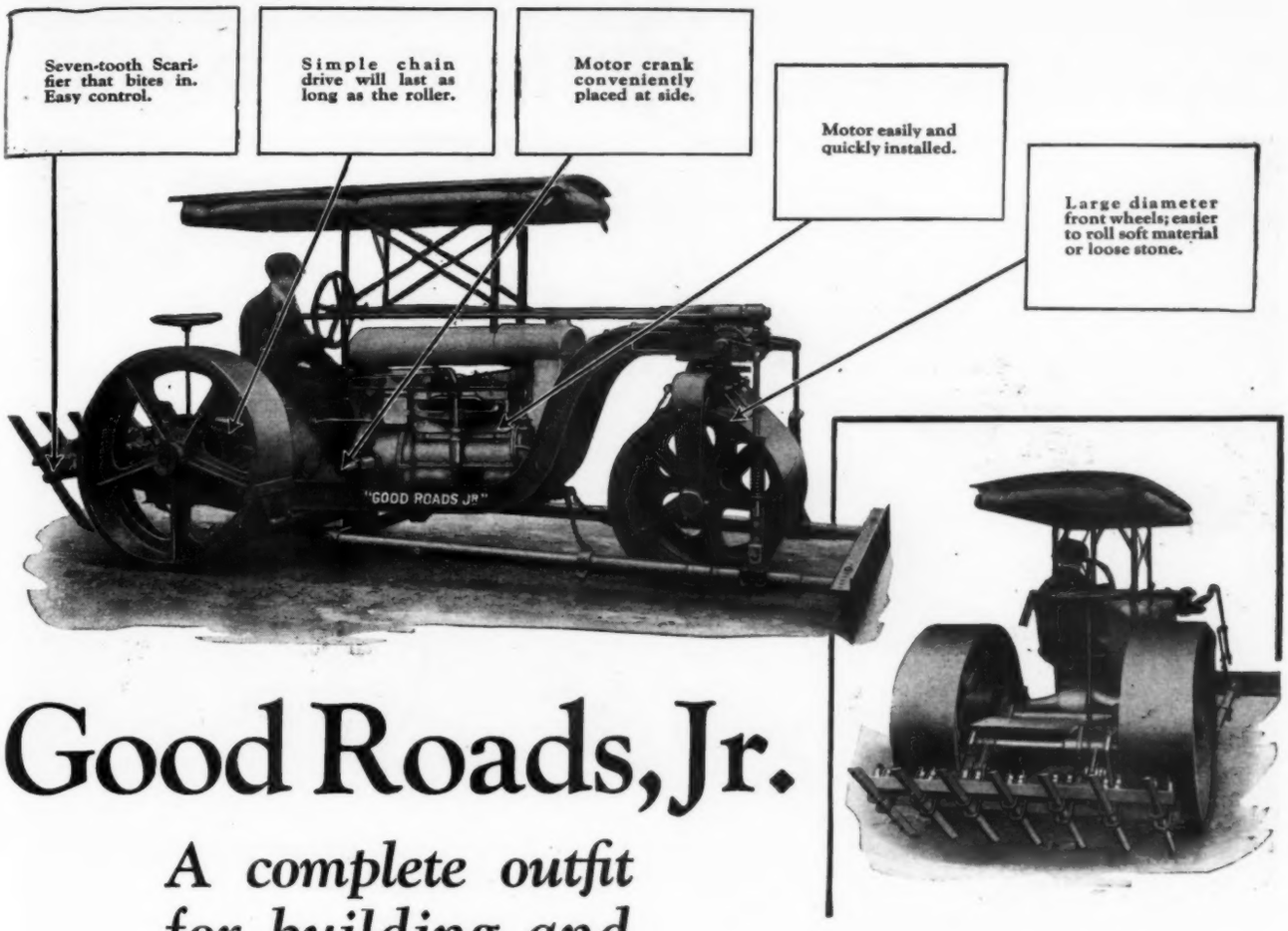
Although single cities have laid as much as 500,000 square yards, Vibrolithic progress is not controlled by large areas in the greater centers of population, but is distributed over 218 different localities. Of the towns that have constructed Vibrolithic, 46 per cent have less than 5,000 population; over 16 per cent are between 5,000 and 10,000, and 17 per cent are between 10,000 and 20,000.

Today you will find Vibrolithic on both the east and west coasts, as far north as Vancouver, B. C., and south to San Antonio, Texas.

Write for our Illustrated Booklet D-12
"Paving America With Vibrolithic."

American Vibrolithic Corporation
INSURANCE EXCHANGE BUILDING DES MOINES, IOWA

SALES OFFICES IN 22 OTHER CITIES


Seven-tooth Scarifier that bites in. Easy control.
Simple chain drive will last as long as the roller.
Motor crank conveniently placed at side.
Motor easily and quickly installed.
Large diameter front wheels; easier to roll soft material or loose stone.
"GOOD ROADS JR"

Good Roads, Jr.

A complete outfit for building and maintaining roads

ROAD roller—scarifier—leveler—scraper—all in one—this new member of the dependable Good Roads Machinery line has a special appeal for those who aim to reduce the growing costs of highway construction and maintenance. Right at the start, it means a smaller investment, because it combines all the necessary equipment in one machine.

Here's what the Good Roads, Jr. will do:

1. Scarify a dirt, gravel, cinder, or stone road.
2. Plane, grade, and form the road bed.
3. Roll roads or drives—new work or maintenance.
4. Pull a sprinkler, a grader, or wagons loaded with materials.

And it does all this at surprisingly small cost. Extremely moderate consumption of gas and oil. Does not require an expert to operate it.

No wonder we say the Good Roads, Jr. will pay for itself in a short period of use. You'll say so, too, after you've seen it work . . . and we're always glad to arrange a demonstration without obligating you in any way.

Write for full details today. Ask for 1926 catalog.

THE GOOD ROADS MACHINERY CO., INC.
KENNETT SQUARE, PENNA.
Service and delivery branches in principal cities

Everything for the Road Maker

Road Graders
Road Drags
Road Oiling Machines
Heating Kettles
Rock Crushers
Steam Road Rollers
Tandem Rollers
Engine and Boiler
Corrugated Culvert Pipe
Gravel Screening Plants
Car Unloaders
Road Plows
Rooter Plows
Drag Scrapers
Wheel Scrapers
Dump Wagons
Sand and Gravel Plants
Street Sweepers

New!
Good Roads Motor Grader!
See it at the Chicago Road Show.

Good Roads MACHINERY
TRADE MARK

Good Roads MACHINERY

Dependable Power for Every Purpose

CONTINENTAL MOTORS · Power that Runs a Nation · AMERICA'S STANDARD

Dependability

If there has been one dominant factor determining the favorable acceptance of the gasoline motor in the industrial field, that factor has been dependability.

With dependability assured, there remains no deterrent factor to stand in the way of universal preference for gasoline power.

This view of dependability has governed Continental design from the time the industrial field was entered, and as a result gasoline powered equipment has taken on a new meaning from the standpoint of profitable operation.

Interchangeability of parts, universal replacement supply, sturdy construction, superior quality of materials, and intelligent design have brought Continental Gasoline power units to the highest efficiency in industrial application.

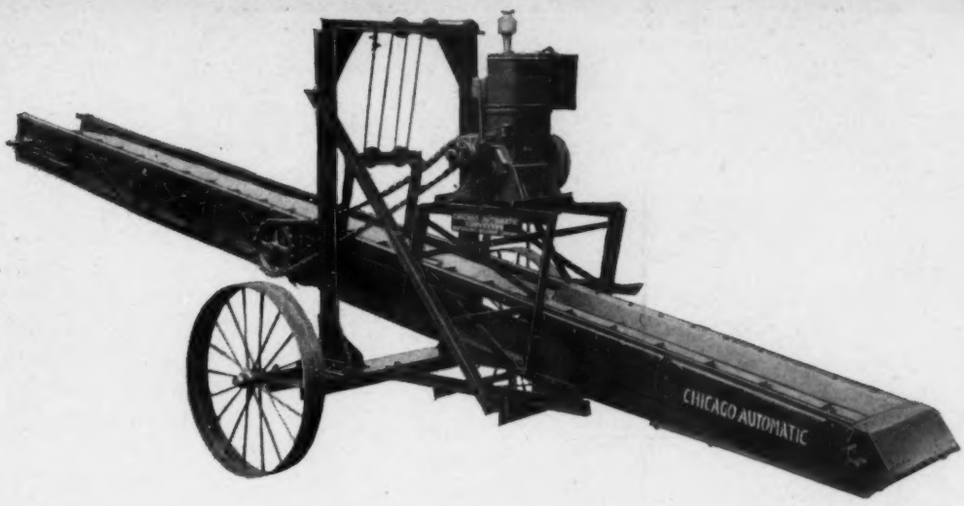
Put Your Power Problems Up to "Power Headquarters"

CONTINENTAL MOTORS CORPORATION

Offices: Detroit, Michigan, U. S. A. *Factories:* Detroit and Muskegon

The Largest Exclusive Motor Manufacturer in the World.

Continental Motors



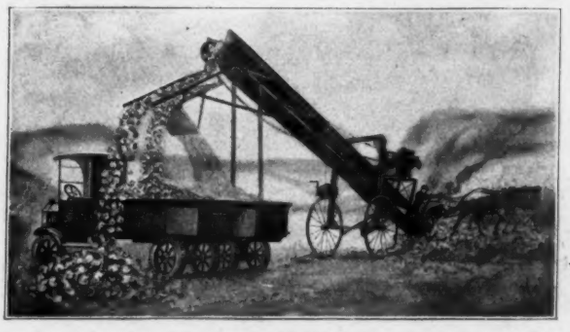
The New Improved Chicago Automatic Conveyor

Will Handle Screened Gravel and Crushed Stone as Readily as Sand and Gravel. Its Design and Construction Particularly Fits the Chicago Automatic for Handling All Troublesome Materials.

Troughed Belt Type—Motor or Gas Engine

Two Types—Light and Heavy $\frac{14''}{18''}$ & Belt

Also Made in Stationary Types for Loading Hoppers



No. 206

Chicago Automatic Conveyors Can Be Furnished with Single or Double Deck Shaker Screen. Above Photo Shows Conveyor Equipped with Double Deck, Separating 3 Sizes of Materials.

No. 244

Chicago Automatic Light Model Conveyor BT-12, 14" Belt, Complete on Wheels with 3 H.P. Gasoline Engine and Clutch. Price, 24 Ft. Length, $515.00.

Booth No. 9 WB Good Roads Show

Chicago Automatic Conveyor Co.

980 Old Colony Bldg. **Chicago, Ill.**

After all—you buy Performance!

THAT'S what the Koehring Company applies all of its experience and resources to give you — *performance on the job!*

To us, Mixer performance means an extra yardage of concrete on the subgrade every day — *continued, sustained, uninterrupted performance, day after day, job after job!*

This is the result of saving of seconds per batch, of features of operation which enable the operator to maintain full capacity, top speed operation every hour of the day! This, *plus* dependable reliability, which is a matter of *Heavy Duty Construction means Koehring performance!*

Reputation is something that is earned —and we believe that the Koehring reputation, earned on thousands of jobs by operating performance in the hands of hundreds of contractors, is a safe guide in mixer choice.

No, you do not pay for Koehring reputation, but for the things that have earned that reputation. You buy Koehring *performance which pays you extra profits!*

SIZES

Paver—7-E, 13-E, 27-E. Auxiliary equipment and choice of power to suit individual needs. Complies with A. G. C. Standards.

Construction Mixers — 10-S, 14-S, 21-S, 28-S. Steam, gasoline or electric power. Mounted on trucks or skids. Rubber tired wheels optional. 28-S on skids only. Complies with A. G. C. Standards.

Dandie Light Mixer — 107-S. Two or four cylinder gasoline engine. Power charging skip, or low charging hopper and platform. Rubber tired steel disc wheels or steel rimmed wheels. Complies with A. G. C. Standards.

Write for Paver Catalog No. P. 14.

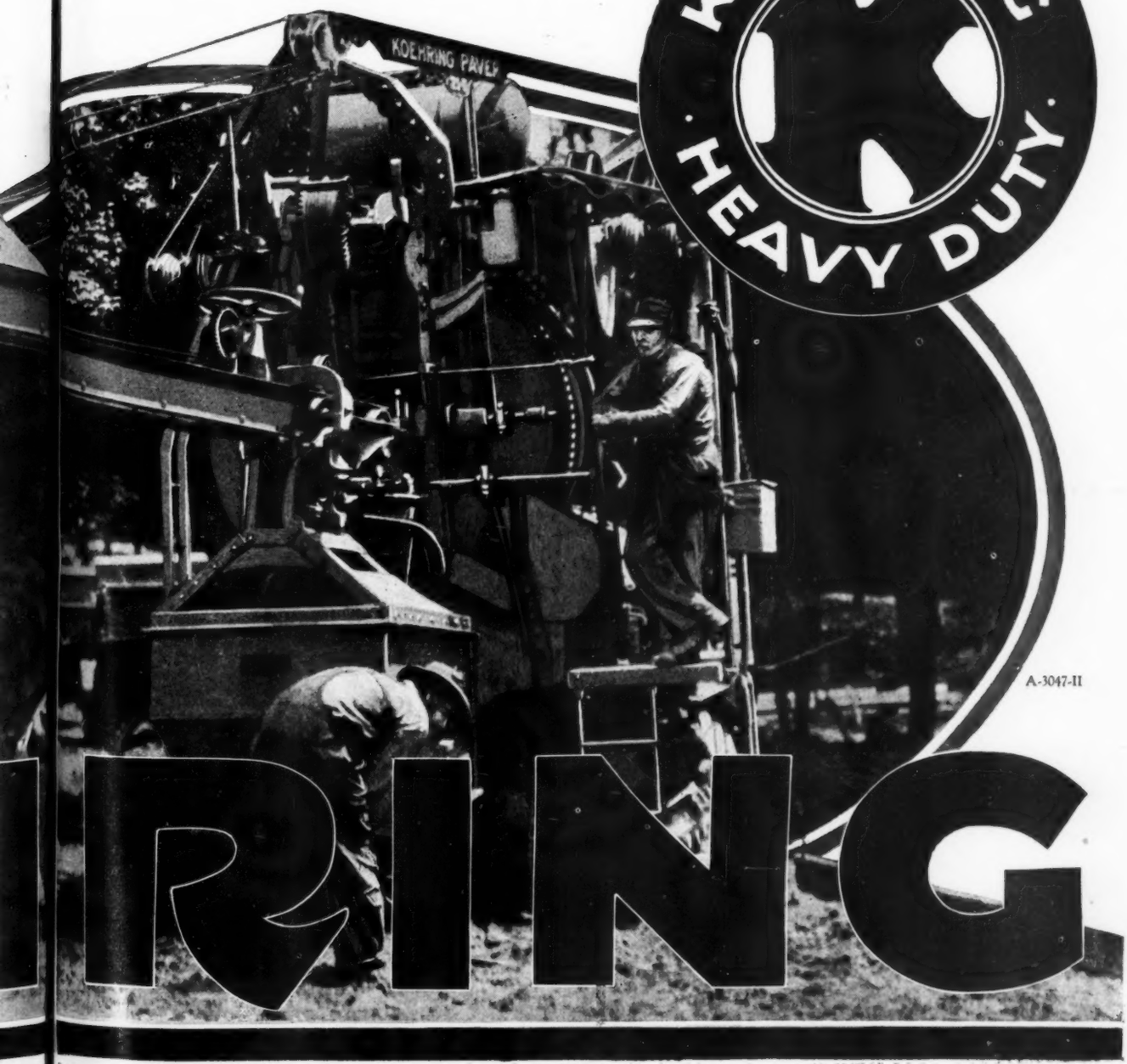
KOEHRING COMPANY
PAVERS, MIXERS—GASOLINE SHOVELS, CRANES AND DRAGLINES
MILWAUKEE, WISCONSIN
Sales Offices and Service Warehouses in all principal cities
Foreign Dept., Room 1370, 50 Church St., New York City.
Canada, Koehring Company of Canada, Limited, 105 Front St., East, Toronto, Ontario
Mexico, F. S. Lapum, Cinco De Mayo 21, Mexico, D. F.

27E

KOEHRING capacities are strictly rated according to A. G. C. Standards, with no allowance for liberal drum dimensions, automatic features of operation and control, fast charging, fast discharging, or high speed distributing bucket travel, all of which contribute to extra yardage possible in excess of rated drum capacities.

27-E Paver—Width of tread adjustable, permitting tread to be narrowed so as to provide working room in close quarters, such as when paving half width roads. Speed reducing gears, transmission gears to drum drive shaft, and traction change speed gears run in oil bath in dust-tight housing. Low upper frame is collapsible type. Double, equalizing charging skip cables, two on each side of skip. See the 27-E!

KOEHRING · HEAVY DUTY ·



A-3047-II

RING

Road Men and Contractors *need* DOWFLAKE *The Year Round*

For Concrete Curing

All during pouring season contractors need Dowflake for concrete curing. It saves ponding, earth covering and earth removal. One man does all the curing with Dowflake

For Pavement Patching

Patches on busy highways can be completed and the road opened to traffic almost overnight. Dowflake patches save their cost in watchman and lanterns alone.

For Cold Weather Concrete

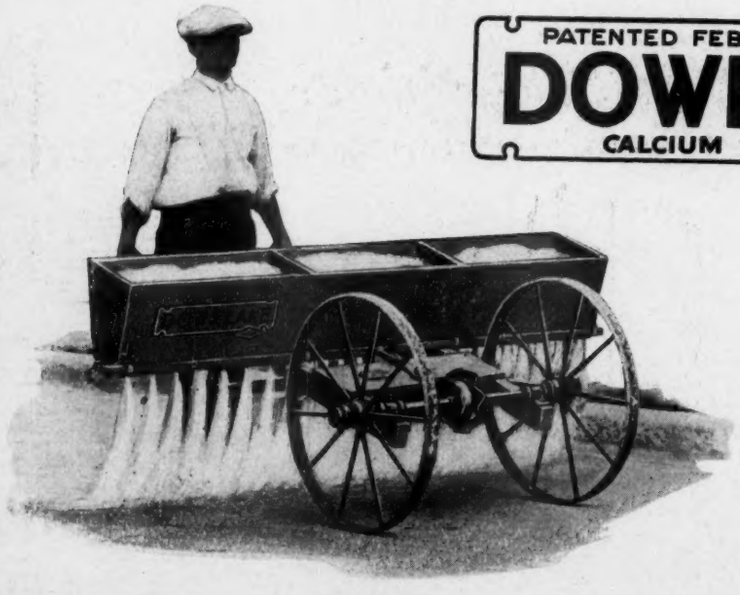
Proper amounts of Dowflake in the mix speed up the sluggish action of concrete made in cold weather.

For Road Maintenance

Highway officials find that Dowflake keeps down dust all summer and binds gravel road surfaces so firmly that they last twice as long.

For Gravel Road Patches

Dowflake is used from coast to coast for gravel road patches that bind in with the road and pack and stay.



PATENTED FEBRUARY 17 - 1925
DOWFLAKE
CALCIUM CHLORIDE
DOW

Write for These Books!

Send for Your Copy of

"How to Maintain Roads"
"How to Cure Concrete"

THE DOW CHEMICAL COMPANY, Midland, Michigan

Branch Sales Offices: **90 West Street, New York City—Second and Madison Streets, Saint Louis**

NEWS OF THE SOCIETIES

Jan. 5-6—ASSOCIATED GENERAL CONTRACTORS, CENTRAL BRANCH. Meeting at Des Moines, Ia.
Jan. 7-9—ASSOCIATED GENERAL CONTRACTORS, NORTHWEST BRANCH. Meeting at Minneapolis.
Jan. 11—INTERNATIONAL ASSOCIATION OF STREET SANITATION OFFICIALS. Annual meeting at Chicago, Ill.
Jan. 11-15, 1926—AMERICAN ROAD BUILDERS' ASSOCIATION. Annual convention and road show at Chicago.
Jan. 13-14—KENTUCKY-TENNESSEE SECTION, A. W. W. A. First Meeting at Louisville, Ky.
Jan. 13-15—AMERICAN ENGINEERING COUNCIL. Annual meeting at Washington, D. C.
Jan. 18-23—ASSOCIATED GENERAL CONTRACTORS OF AMERICA. Annual meeting at Portland, Ore.
Jan. 18-23—TEXAS SECTION, SOUTHWEST WATER WORKS ASSOCIATION. Short school for water-plant operators at Fort Worth.
Jan. 20-22—AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual meeting at New York, N. Y.
Feb. 17-19—ASSOCIATION OF HIGHWAY OFFICIALS OF THE NORTH ATLANTIC STATES. Annual meeting at Syracuse, N. Y.
Feb. 22-23—AMERICAN CONCRETE PIPE ASSOCIATION. Annual convention at Chicago.
Feb. 23-26—AMERICAN CONCRETE INSTITUTE. Annual convention at the Sherman Hotel, Chicago, Ill.
June 7-11—AMERICAN WATER WORKS ASSOCIATION. Forty-sixth annual convention at Buffalo, N. Y.

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS

This association held its business and technical meeting at Detroit, Mich., on Nov. 18 to 21. The secretary presented a report showing receipts of $14,748 and expenditures of $12,629; while the treasurer's report showed a balance of $5,019 on November 1. Officers selected for the coming year were as follows: president, Frank Page; vice president, L. D. Blauvelt; secretary, Frank T. Sheets, and treasurer, Paul Jones. Among the resolutions adopted was one urging the authorization by Congress of expending as Federal aid 80 million dollars a year in 1928 and 1929; that no reduction be made in the present mileage of Federal aid roads, but that certain changes be made in the present practices providing for increase of limits in certain states; that the uniform system of marketing roads be adopted, and also the uniform questionnaire for determining the responsibility of contractors; and that the salary of the chief of the Bureau of Public Roads be materially increased.

ASSOCIATED GENERAL CONTRACTORS OF AMERICA

The annual meeting of this association will be held at the Multnomah Hotel, Portland, Ore., January 19 to 23. There will be a meeting of the Executive Board on Tuesday morning; meetings of the Building, Public Works, Highway and Railroad Divisions on Wednesday; and an all-day session of the Executive Board and a separate meeting of the Secretaries' Council on Saturday. Thursday and Friday will be given over to sessions of the annual meeting. A special train will leave Chicago on the night of Thursday, January 14, making stop-overs at Colorado Springs and Salt Lake City.

HIGHWAY PROMOTION ASSOCIATION

A new association with the above title has been organized in San Francisco by contractors and representatives of firms dealing in road materials and equipment, surety bonds, etc., "to further and extend highway construction and maintenance." Officers elected are: President, Henry K. Kaiser; secretary, Roy Fallon; treasurer, Harry Lesser. In addition, 12 directors were selected from the various branches of business, contracting, and so forth, represented in the association.

KENTUCKY-TENNESSEE SECTION, AMERICAN WATERWORKS ASSOCIATION

The Kentucky-Tennessee Section of the A. W. W. A. has been organized and will hold its first meeting on January 13th and 14th at Louisville, Ky. The secretary is F. C. Dugan, 532 West Main St., Louisville.

INTERNATIONAL ASSOCIATION OF STREET SANITATION OFFICIALS

This association will hold its annual conference on January 11th and 12th at Chicago. Secretary A. M. Anderson states that among the subjects to be discussed are, Increased Service and Comparative Costs; Tax Reductions; Relation between Type of Pavement and Maintenance; Department Personnel; and Compensation Problems.

AMERICAN ROAD BUILDERS ASSOCIATION

The advance program of the twenty-third annual convention of this association has just been made public. The convention is to be held in Congress Hotel, Chicago, January 12 to 14. Chas. M. Upham is convention manager. In connection with the convention, there will be the Road Show which has become a regular feature. Fully twice the space available in the Coliseum for exhibits has been asked for and quite a number of exhibits will be shown outside that building. A list of the exhibitors follows the program below:

TUESDAY, JANUARY 12

General Session, Tuesday Morning at 10:00

Presiding—William H. Connell, President.

Opening Address by the President.

Addresses by: Honorable Len Small, Governor of Illinois; Honorable Wm. E. Dever, Mayor of Chicago; C. H. Markham, President, Illinois Central Railroad; and one of the leading financial men of the country.

Tuesday Afternoon at 2:00
Engineering Problems

Presiding—Frank F. Rogers, State Highway Commissioner of Michigan.

General Subject—Financing and Locating Highways.

2:00 *Financing Highways*—(Federal, State, County and City): Thos. H. McDonald, chief, Bureau of Public Roads, U. S. Department of Agriculture.

3:00 *Locating Rural Highways:* W. W. Crosby, location engineer, Pennsylvania Department of Highways.

4:00 *Arterial Street Planning in Cities:* Eugene S. Taylor, manager, Chicago Plan Commission.

5:00 *Activities of Highway Research Board of the National Research Council:* Charles M. Upham, director.

Constructors' Problems

Presiding—James Cameron, president, Illinois Association Highway and Municipal Contractors.

General Subject—Making the Contracting Business Pay.

2:00 *Investigation of Projects on Which You Bid:* N. F. Helmers, president, Siems, Helmers and Schaffner, St. Paul, Minnesota.

3:00 *Estimating the Job:* A. R. Hirst, chief engineer, American Vibrolithic Corporation, Des Moines, Iowa.

3:45 *Prosecuting the Work and Keeping Intelligent Cost Records:* W. R. Smith, president, The Lane Construction Company, Meriden, Connecticut.

4:30 *Qualifications of the Contractor:* Col. George B. Walbridge, president, Associated General Contractors of America.

WEDNESDAY, JANUARY 13

Wednesday Morning at 10:00
General Session; Joint Meeting with the National Highway Traffic Association

Presiding—A. H. Blanchard, president, National Highway Traffic Association.

10:00 *Measures for the Safety and Convenience of the Traveling Public*—(Signs, Policing, Traffic Lines, etc.): Col. Sidney D. Waldron, Detroit, Michigan; member Executive Committee, American Automobile Association.

11:00 *Future Developments of the Motor Vehicle:* C. F. Kettering, General Motors Research Corporation.

12:00 *Possibilities of Motor Vehicle Transportation as a Supplement to Railroad Operation:* Officer of a steam railroad system.

Wednesday Afternoon at 2:00
Engineering Problems

Presiding—George W. Borden, State Highway Engineer of Nevada.

General Subject—Construction.

2:00 *Governing Factors in Selection of Durable Types of City Pavements:* C. M. Pinckney, chief engineer, Borough of Manhattan, New York City.

3:00 *Recent Developments in Concrete Paving Practice:* H. E. Surman, engineer of design, Division of Highways, Illinois Department of Public Works and Buildings.

4:00 *Recent Developments in Bituminous Paving Practice:* Harry Rex, construction engineer, Raleigh, N. C.

Constructors' Problems

Presiding—W. F. Creighton, president, Foster and Creighton Company, Nashville, Tennessee.

General Subject—Practical Operating Methods.

2:00 *Increased Costs Due to Improper Fine Grading Methods:* C. J. Moritz, contractor, Effingham, Illinois.

2:45 *Relative Merits of Yard Handling of Materials with Derricks, Cranes, Conveyors, etc.:* Robert R. Petersen, Henry W. Horst Company, Rock Island, Illinois.

3:30 *Economics of Equipment Standardization:* Speaker not yet selected.

4:15 *How to stop Cement Over-Run:* Robert E. O'Connor, J. C. O'Connor and Sons, Fort Wayne, Indiana.

Business Meeting, Wednesday Afternoon at 4:30

Annual Banquet, Wednesday Night at 7:00
Principal Speaker—Charles M. Schwab

THURSDAY, JANUARY 14

Engineering Problems

Presiding—Paul D. Sargent, chief engineer, Maine Highway Department.

General Subject—Operation and Maintenance.

10:00 *Snow Removal:* Victor T. Burton, State Highway Department, Lansing, Michigan.

11:00 *Gang vs. Caretaker Maintenance:* William H. Acheson, division engineer, New York State Department of Public Works.

12:00 *Surface Treatment of Various Types of Roads:* J. N. Mackall, chief engineer, Maryland Highway Department, Baltimore, Maryland.

Constructors' Problems

Presiding—Edward McCrady, president, McCrady Brothers Company, Braddock, Pennsylvania.

General Subject—Enlarging the Contractor's Field.

10:00 *Economic Reasons for Winter Letting of Road Work:* J. H. Mullen, vice-president, Nelson, Mullen, Nelson, Inc., Minneapolis, Minnesota.

11:00 *Relations Between the General Contractor and Sub-Contractor:* C. E. Hair, president, Belmont Trucking Company, Terre Haute, Ind.

12:00 *Resurfacing and Maintenance Work as a Future Field for the Contractor:* George F. Schlesinger, director of Highways and Public Works, Columbus, Ohio.

Thursday Morning at 10:00
Final General Session, Thursday Afternoon at 2:00

Presiding—S. M. Williams, vice-president, Autocar Sales and Service Company, Ardmore, Pennsylvania.

General Subject—The Contractor and the Engineer.

2:00 *One-sided Clauses in Public Works Specifications:* General R. C. Marshall, Jr., General Manager of Associated General Contractors of America.

3:00 *Relations between the Contractor and the Engineer:* C. M. Babcock, State Commissioner of Highways, St. Paul, Minnesota.

EXHIBITORS AT THE 1926 ROAD SHOW

Ahlberg Bearing Co., Chicago, Ill.
J. D. Adams & Co., Indianapolis, Ind.
American Bosch Magneto Co., Springfield, Mass.
American Casting Co., Birmingham, Ala.
American City Magazine, New York City.
American Cement Machine Co., Inc., Keokuk, Iowa.
American Gas Accumulator Co., Elizabeth, N. J.
American Hoist & Derrick Co., St. Paul, Minn.
American Manganese Steel Co., Chicago Heights, Chicago.
American Malleable Castings Assn., Cleveland, O.
American Tar Products Co., Pittsburgh, Pa.
American Steel & Wire Co., Chicago, Ill.
Atlas Lumnite Cement Co., New York City.
Alan Wood, Iron & Steel Co., Philadelphia, Pa.
American Vibrolithic Corp., Des Moines, Iowa.
Amiesite Asphalt Co. of America, Philadelphia, Pa.
Anthony Co., Inc., Streator, Ill.
The Asphalt Association, New York City.
Armco Culvert & Flume Mfgrs. Assn., Middletown, Ohio.
Association Pennsylvania Constructors, Harrisburg, Pa.
Associated Equipment Distributors, Chicago, Ill.
Asphalt Block Pavement Co., Toledo, Ohio.
Austin Machinery Corp., Muskegon, Mich.
Austin Mfg. Co., Chicago, Ill.
Austin-Western Road Machinery Co., Chicago, Ill.
Autocar Sales & Service Co., Chicago, Ill.
Automatic Signal & Sign Co., Chicago, Ill.
American Wood Preservers' Assn., Chicago, Ill.

Baker Mfg. Co., The, Springfield, Ill.
Barber-Greene Co., Aurora, Ill.
Barber Asphalt Co., Philadelphia, Pa.
Barnes Mfg. Co., Mansfield, Ohio.
Barrett Co., The, New York City.
Bates Machine & Tractor Co., Joliet, Ill.
Bay City Dredge Works, Bap City, Mich.
Beaver Mfg. Co., Milwaukee, Wis.
Belle City Mfg. Co., Racine, Wis.
Black & Decker Mfg. Co., Towson, Md.
Blaw-Knox Co., Pittsburgh, Pa.
Robt. Bosch Magneto Co., Chicago, Ill. and New York City.
Brown Hoisting Machinery Co., Cleveland, Ohio.
Brown-Lipe Gear Co., Syracuse, N. Y.
The Buda Co., Harvey, Ill.
Buffalo-Springfield Roller Co., Springfield, Ohio.
Buhl Co., Chicago, Ill .
Burch Plow Works, Crestline, Ohio.
Butler Bin Co., Waukesha, Wis.
Bradley-Badger Engineering Co., Inc., Chicago, Ill.
Byers Machine Co., Ravenna, Ohio.

Philip Carey Co., Lackland, Cincinnati, Ohio.
Carr Fastener Co., Cambridge, Mass.
Ralph B. Carter Co., New York City.
J. I. Case Threshing Machine Co., Racine, Wis.
Caterpillar Tractor Co., Peoria, Ill.
Celite Products Co., New York City.
Chain Belt Co., Milwaukee, Wis.
C. H. & E. Mfg. Co., Milwaukee, Wis.
Chausse Oil Burner Co., Elkhart, Ind.
Chicago Pneumatic Tool Co., New York City.
Chilton Co., Philadelphia, Pa.
Clark Tructractor Co., Buchanan, Mich.
Clay Products Assn., Chicago, Ill.
Cleveland Tractor Co., Cleveland, Ohio.
Cleveland Wheelbarrow & Mfg. Co., Cleveland, Ohio.
Climax Engineering Co., Clinton, Iowa.
Clyde Iron Works Sales Co., Duluth, Minn.
Commerce Motor Truck Co., Ypsilanti, Mich.
Concrete Steel Co., New York City.
Conneaut Shovel Co., Conneaut, Ohio.
Construction Machy. Co., Waterloo, Iowa.
Continental Motors, Detroit, Mich.
B. M. Cropp Co., Chicago, Ill.
The F. D. Cummer & Son Co., Cleveland, Ohio.
Curtis Pneumatic Machinery Co., St. Louis, Mo.
Cyclone Fence Co., Waukegan, Ill.
Chicago Automatic Conveyor Co., Chicago, Ill.
Cleveland Pneumatic Tool Co., Cleveland, Ohio.

Davenport Locomotive Works, Davenport, Iowa.
Domestic Engine & Pump Co., Shippensburg, Pa.
Dow Chemical Co., Midland, Mich.
The Dravo Contracting Co., Pittsburgh, Pa.

Eagle Wagon Works, Auburn, N. Y.
Equipment Corp. of America, Chicago, Ill.
Eisemann Magneto Corp., New York City, Chicago, Ill.
Elgin Sales Corp., Chicago, Ill., New York City.
Erie Steel Construction Co., Erie, Pa.
Evinrude Motor Co., Milwaukee, Wis.
Electric Wheel Co., Quincy, Ill.
Engineering News Record, New York City.
Engineering & Contracting Publishing Co., Chicago, Ill.
Erie Steam Shovel Co., Erie, Pa.
Essco Mfg. Co., Peoria, Ill.
E. D. Etnyre Co., Oregon, Ill.

The Fate-Root-Heath Co., Plymouth, Ohio.
The J. D. Farasey Co., Cleveland, Ohio.
Flexible Road Joint Mach. Co., Cleveland, Ohio.
S. Flory Mfg. Co., Bangor, Pa.
Foote Concrete Machinery Co., Chicago, Ill.
A. W. French & Co., Chicago, Ill.
Farrell-Cheek Steel Foundry Co., Sandusky, Ohio.
French & Hecht, Davenport, Iowa.
Fruehauf Trailer Co., Detroit, Mich.
Full-Crawler Co., Milwaukee, Wis.
Fuller & Johnson Mfg. Co., Madison, Wis.

Galion Iron Works & Mfg. Co., Galion, Ohio.
Garford Motor Truck Co., Lima, Ohio.
General Motors Truck Co., Pontiac, Mich.
Gerlinger Electric Steel Casting Co., West Allis, Wis.
Graham Bros., Detroit, Mich.
Gilbert Mfg. Corp., Aberdeen, South Dakota.
W. S. Godwin Co., Inc., Baltimore, Md.
Good Roads Machinery Co., Kennett Square, Pa.

Hadfield-Penfield Steel Co., Bucyrus, Ohio.
George Haiss Mfg. Co., New York City.

Harnischfeger Sales Corp., Milwaukee, Wis.
Hastings Pavement Co., New York City.
The Hayward Co., New York City.
James A. Hagy Wagon Co., Abingdon, Va.
Heil Co., Milwaukee, Wis.
Heltzel Steel Form & Iron Co., Warren, Ohio.
The Hercules Corp., Evansville, Ind.
Hercules Motor Corp., Canton, Ohio.
Highland Body Mfg. Co., Cincinnati, Ohio.
Highway Trailer Co., Edgerton, Wis.
Hinkley Motors, Inc., Detroit, Mich.
Hotchkiss Steel Products Co., Binghamton, N. Y.
Huber Mfg. Co., Marion, Ohio.
Hug Company, Highland, Ill.
Hughes-Keenan Co., Mansfield, Ohio.
The Humphreys Mfg. Co., Mansfield, Ohio.
Hydraulic Hoist Mfg. Co., Inc., St. Paul, Minn.

Ideal Concrete Machinery Co., Cincinnati, Ohio.
Indiana Truck Corp., Marion, Ind.
Ingersoll Rand Co., New York City.
Inland Engineering Co., Chicago, Ill.
Insley Mfg. Co., Indianapolis, Ind.
International Harvester Co. of America, Inc., Chicago, Ill.
International Motor Co., New York City.
International Trade Press, Inc., Chicago, Ill.

C. S. Johnson Engineering Co., Champaign, Ill.
Jones Superior Machine Co., Chicago, Ill.

Kalman Steel Co., Chicago, Ill.
Kentucky Rock Asphalt Co., Louisville, Ky.
Keystone Driller Co., Beaver Falls, Pa.
Kinney Mfg. Co., Boston, Mass.
Knickerbocker Co., Jackson, Mich.
Koehring Co., Milwaukee, Wis.
Koppel Industrial Car & Equipment Co., Chicago, Ill.
Kwick-Mix Concrete Mixer Co., Port Washington, Wis.

La Plant-Choate Mfg. Co., Cedar Rapids, Iowa.
Lakewood Engineering Co., Cleveland, Ohio.
Lee Trailer & Body Co., Chicago, Ill.
Le Roi Co., Milwaukee, Wis.
Leach Co., Oshkosh, Wis.
Lidgerwood Mfg. Co., New York City.
Link Belt Co., Chicago, Ill.
Littleford Bros., Cincinnati, Ohio.
Little Red Wagon Co., Omaha, Neb.
Lufkin Rule Co., Saginaw, Mich.

McKiernan-Terry Drill Co., New York City.
The McMyler Interstate Co., Bedford, Ohio.
Macwhyte Company, Kenosha, Wis.
Manufacturers Record, Baltimore, Md.
Marsh-Capron Co., Chicago, Ill.
Marion Steel Body Co., Marion, Ohio.
Macleod Co., Cincinnati, Ohio.
Metal Forms Corp., Milwaukee, Wis.
Mastor Motor Truck Mfg. Co., Chicago, Ill.
Mead-Morrison Mfg. Co., Cambridge, Mass.
Metalweld Service Corp., Philadelphia, Pa.
Miami Trailer-Scraper Co., Troy, Ohio.
The Alexander Milburn Co., Baltimore, Md.
Milwaukee Locomotive Mfg. Co., Milwaukee, Wis.
Mosher Mfg. Co., Lima, Ohio.
Monarch Tractors, Inc., Watertown, Wis.
The Mundie Mfg. Co., Peru, Ill.
Muskegon Machine Co., Newburgh, N. Y.
Mohawk Motors Corp., Peoria, Ill.
Metropolitan Body Co., Bridgeport, Conn.

National Paving Brick Mfgrs. Assn., Cleveland, Ohio.
National Steel Fabric Co., Pittsburgh, Pa., Chicago, Ill.
Northern Conveyor & Mfg. Co., Janesville, Wis.
Northwest Engineering Works, Chicago, Ill.
Novo Engine Co., Lansing, Mich.

O'Connell Motor Truck Co., Waukegan, Ill.
The Oil Jack Co., New York City.
O. K. Clutch & Machinery Co., Columbia, Pa.
Orton & Steinbrenner Co., Chicago, Ill.
Osgood Company, Marion, Ohio.
Tinius Olsen Testing Machine Co., Philadelphia, Pa.
Owen Bucket Co., Cleveland, Ohio.

Parsons Company, Newton, Iowa.
Page Steel & Wire Co., Bridgeport, Conn.
Perforated Concrete Roller Works, Kankakee, Ill.
Peru Plow and Wheel Co., Peru, Ill.
Pit & Quarry, Chicago, Ill.
Pittsburgh Testing Laboratory, Pittsburgh, Pa.
Portland Cement Assn., Chicago, Ill.
Public Works, New York City.

Racine Radiator Co., Racine, Wis.
Ransome Concrete Machinery Co., Dunellen, . J.
Remmel Manufacturing Co., Kewaskum, Wis.
Republic Motor Truck Co., Alma, Mich.
Riehl Bros. Testing Machine Co., Philadelphia, Pa.
Rock Products, Chicago, Ill.
The Rotary Snow Plow Co., Minneapolis, Minn.
Russell & Co., Massillon, Ohio.
Russell Grader Mfg. Co., Minneapolis, Minn.
Joseph T. Ryerson & Son, Inc., Chicago, Ill.

Sauerman Bros., Chicago, Ill.
Schramm, Inc., West Chester, Pa.
Service Motors, Inc., Wabash, Ind.
Servicised Products Corp., Chicago, Ill.
Shaw-Enochs Tractor Co., Minneapolis, Minn.
Simons Paint Spray Brush Co., Dayton, Ohio.
Simplicity Engineering Co., Durand, Mich.
Sivyer Steel Castings Co., Milwaukee, Wis.
Smith Engineering Works, Milwaukee, Wis.
T. L. Smith Co., Milwaukee, Wis.
Snap-On Wrench Co., Chicago, Ill.
Splitdorf Electrical Co., Newark, N. J.
Standard Scale Supply Co., Pittsburgh, Pa.
Sterling Motor Truck Co., West Allis, Milwaukee Wis.
Sullivan Machinery Co., Chicago, Ill.
Stockland Road Machinery Co., Minneapolis, Minn.
Sterling Wheelbarrow Co., Milwaukee, Wis.
Stover Mfg. & Engine Co., Freeport, Ill.
Superior Body Corp., Marion, Ind.
Solvay Process Co., New York City.
Speeder Machinery Corp., Fairfield, Iowa.

Taylor-Wharton Iron & Steel Co., High Bridge, N. J.
Trailmobile Co., Cincinnati, Ohio.
Tennessee Tool Works, Inc., Knoxville, Tenn.
Timken Roller Bearing Co., The, Canton, Ohio.
The Texas Co., New York City.
Chas. T. Topping Machinery Co., Dayton, Ohio.
Thew Shovel Co., Lorain, Ohio.
The Tractor Grip Wheel Co., Toledo, Ohio.
Thomas Elevator Co., Chicago, Ill.
Twin Disc Clutch Co., Racine, Wis.
Truscon Steel Co., Youngstown, Ohio.

Universal Crusher Co., W. Cedar Rapids, Iowa.
Universal Motor Co., Oshkosh, Wis.
Universal Crane Co., Cleveland, Ohio.
Union Iron Products Co., East Chicago, Ill.
United Motors Products Co., Grand Rapids, Mich.

Vulcan Iron Works, Wilkes-Barre, Pa.

Watson Truck Corp., Canastota, N. Y.
Walter Motor Truck Co., Long Island City, N. Y.
Waukesha Motor Co., Waukesha, Wis.
Wausau Iron Works, Wausau, Wis.
Wehr Co., Milwaukee, Wis.
Western Wheeled Scraper Co., Aurora, Ill.
Whitehead & Kales Co., Detroit, Mich.
Geo. D. Whitcomb, Rochelle, Ill.
The White Co., Cleveland, Ohio.
Wiard Plow Co., Batavia, N. Y.
G. H. Williams Co., Erie, Pa.
Williamsport Wire Rope Co., Chicago, Ill.
Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.
Wisconsin Motor Mfg. Co., Milwaukee, Wis.
Wood Hydraulic Hoist & Body Co., Detroit, Mich.

PERSONALS

Davis, Howell J., has been appointed acting city manager of Knoxville, Tenn., during the absence on sick leave of manager Louis Brownlow.

Frahm, H. C., formerly a division engineer of North Dakota State Highways, has been appointed state engineer and chief engineer of the State Highway Commission.

Black, W. G., formerly state engineer of North Dakota and chief engineer of the State Highway Commission, has resigned these positions.

Hodgkins, Henry C., of the firm of Moffett, Hodgkins & Clarke Co., consulting engineers of Syracuse, N. Y., died November 7, aged 71.

Baker, I. O., professor emeritus of civil engineering at the university of Illinois and author of "A Treatise on Masonry Construction," "Roads and Pavements" and other engineering books, died November 8, aged 72.

Sublette, George W., city engineer of Minneapolis from 1899 to 1903 died November 6, aged 75.

Kelley, E. F., has been appointed chief of the Division of Tests and Research, U. S. Bureau of Public Roads, succeeding A. T. Goldbeck who resigned recently.

Boyeau, Jean, has been appointed as resident engineer of the Compagnie Francaise Thomson-Houston, with offices in the International General Electric Company's building, Schenectady.

La Roche, Arthur L., formerly commissioner of public works at Binghamton, N. Y., has joined the San Lucie Plaza engineering staff at Fort Pierce, Fla.

Connolly, Capt. Joel I., district engineer of the U. S. Public Health Service, has been appointed chief of the Bureau of Sanitary Engineering, Chicago Dept. of Health.

Mitchell, Scott, city manager of Boulder, Colo., has resigned.

Alden, Fred S., formerly assistant city engineer of Cedar Rapids, Ia., has been appointed city engineer.

Harrison, E. W., up to 1911 chief engineer of the Passaic Valley Sewerage Commission, died Nov. 27, aged 74.

Foulks, John A., recently chief engineer of the Newark, N. J., water department, has opened an office in that city for consulting practice.

Schmidt, George G., has been appointed city engineer of Indianapolis.

U. S. CIVIL SERVICE EXAMINATIONS

Design Draftsman (Topographic and Subsurface)—Applications will be received until January 19th. To fill a vacancy in the Public Works Dept., Naval Station, Cavite, Philippine Islands. Salary $8.08 a day. Duties consist of the drawing of maps of all kinds, both topographic and subsurface, from original field notes, with calculations as required; designing of pavements, walks and roads; laying out and computing of grading, filling and dredging; and underground service piping, layouts, etc.

Railroad Equipment Engineer—Applications will close on January 5th. To fill a vacancy in the office of the Chief of Engineers, War Department, Washington, D. C. Entrance salary is $3,800 a year with advancement in pay without change in assignment up to $5,000 a year. Duties are to represent the Corps of Engineers and the War Dept. in matters connected with railroad work; to design steam and gasoline locomotive and rolling stock; to design and lay out railway shops; to prepare procurement plans and specifications for railroad equipment, etc.

Senior Architectural Draftsman—Applications will be received until December 26th. To fill vacancy in the office of the Supervising Chief United States Engineer, New York, N. Y. Entrance salary is $1,860 with advancement in pay without change in assignment up to $2,400 a year. Duties consist of designing, working up of complete drawings for repairs, alterations and extensions to buildings of first class construction from field sketches and measurements; making general or detail drawings of moderate complexity or difficulty in accordance with drawings showing lay-out or general design of building; checking drawings or tracings, making routine or technical computations or calculations of moderate difficulty and other related work as required.

NEW CATALOGS

TULSA CENTRIFUGAL PUMPS

The DeLaval Steam Turbine Co. has published a pamphlet describing the steam turbine driven centrifugal pumping units of the new water works plant at Tulsa, Oklahoma.

WHITE DUMP TRUCKS

The White Co. has published an 8-page booklet describing the part played by White dump trucks in preparing the ground for Philadelphia's sesquicentennial celebration.

WATER SOFTENING

The National Lime Association has published a bulletin entitled "Water Softening," wherein it describes the scientific principles and physical plants involved in softening water for municipalities, railroads, ice manufacturing and other industrial plants. Forty-eight pages, well illustrated.

G. E. FLOW METERS

The General Electric Company has published a special 4-page folder, briefly describing its electrically operated meters for measuring steam, water, oil, gas, etc. Also a 44-page booklet describing, in great detail, its mechanically operated meters for the same purpose.

COLD WEATHER MORTAR

The National Lime Association has published a timely bulletin with the above title, in which it describes mortar most suitable for cold weather as indicated by tests at the University of Missouri.

CABLE FOR SUSPENSION BRIDGES

John A. Roebling's Sons Co. has published a handsomely printed, illustrated and bound, book of fifty pages, in which it describes, by means of text, charts and photographs, the methods of calculating, constructing the wire for, and spinning the cables for the Bear Mountain bridge. The book contains 8 diagrams and nearly 100 excellent photographs.

TRUCKS FOR SNOW REMOVAL

With the title, "White Trucks for Low Cost Snow Removal," the White Co. publishes an 8-page folder illustrating, chiefly by photographs, the use of their trucks for removing snow from city streets.

ORTON POWER SHOVEL

The Orton & Steinbrenner Co. has published a 16-page bulletin, No. 39, describing and illustrating its ½, ¾, and 1 yd. power shovels, with several variations as a crane for using clam shell, hook or magnet, and as drag-line excavator and skimmer scoop.

FILTROS PLATES

The General Filtration Co. has just issued a new edition of its Filtros bulletin which, while to a large extent a duplication of the old one, is more comprehensive and contains quite a little new matter in its 34 pages.

CONCENTRATION IN BOILERS

The Andrews-Bradshaw Co. is distributing a reprint of a paper with the above title read by Grant D. Bradshaw before the Engineering Society of West Pennsylvania.

TESTING LABORATORY BULLETINS

The Kansas City testing laboratory has recently issued two bulletins, one entitled "Commercial Water," giving some general information concerning composition, sources, treatment and uses; the other entitled "Cement and Concrete," giving a brief outline of the properties, specifications and basic principles entering into the manufacture of cement and fabrication of concrete.

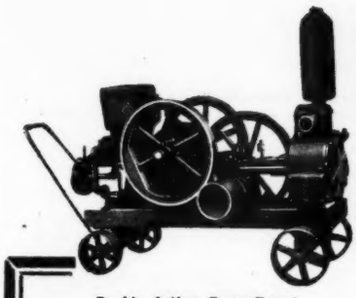
CABLE WAY EXCAVATORS

The American Manufacturing and Engineering Co. has published a 16-page catalog describing its cable way excavators and some representative installations.

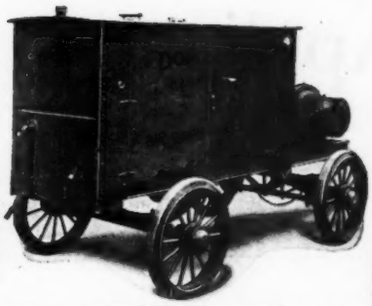
CLIMAX BULLETINS

The Climax Engineering Co. has issued a series of bulletins describing its K, T and R series of engines, all of four cylinder capacity except the R6U which is a 6-cylinder engine. These engines develop power ranging from 35 h.p. to 130 h. p. They are sold as power engines, either portable or stationary.

(Continued on page 54)



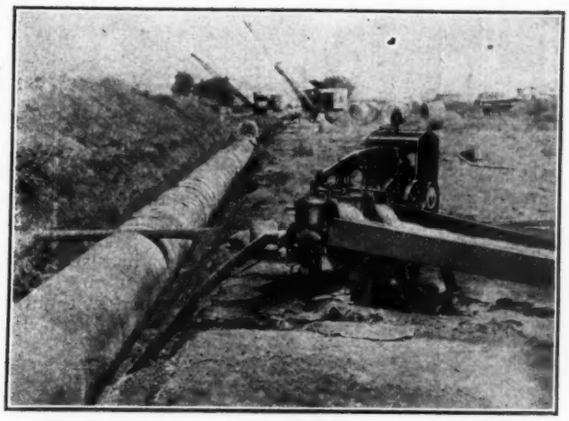
Double Acting Force Trench Pump Unit.



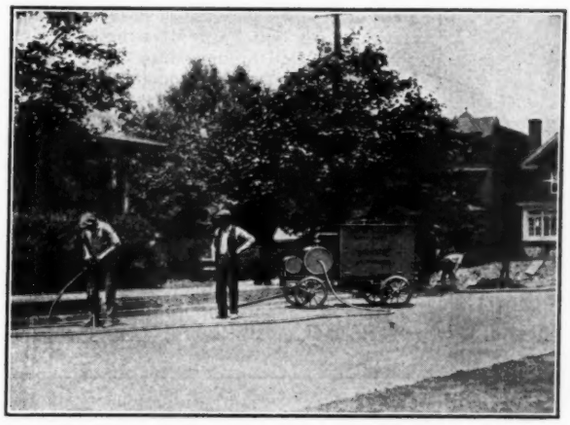
184 cu. ft. Air Compressor mounted on rubber tired trailer.

"DOMESTIC"
Reg. U. S. Pat. Off.

Dependable Pumps and Air Compressors



"Domestic" Double Diaphragm Dump Unit in use on Los Angeles Drainage Dist. No. 11: Thomas Kelley & Sons, Contractors.



"Domestic" 92 cu. ft. Portable Air Compressor Unit, owned by Water Dept. of the City of Harrisburg, Pa.

TRENCH PUMPS

City Water Departments, Gas Companies, Sewerage Departments, Street Departments and Contractors will find "Domestic" Trench Pumps highly efficient and dependable. Made as only the best pumps are made—to give continued service under all conditions.

AIR COMPRESSORS

"Domestic" patented 90 degree direct angle drive Air Compressors are manufactured in sizes of 50, 62, 92 and 184 cu. ft. free air per minute displacement capacity. Furnished mounted on rubber tired trailer, steel wheel trailer or on channels only.

See Our Exhibit at Good Roads Show

Let "Domestic" engineers solve your Pump and Air Compressor problems. We are glad to advise for special requirements.

Descriptive Bulletins furnished without obligation

Domestic Engine & Pump Co.,

Main Office and Factory, Shippensburg, Pa.

—Distributors in Principal Cities—

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

KOEHRING HEAVY DUTY PAVER

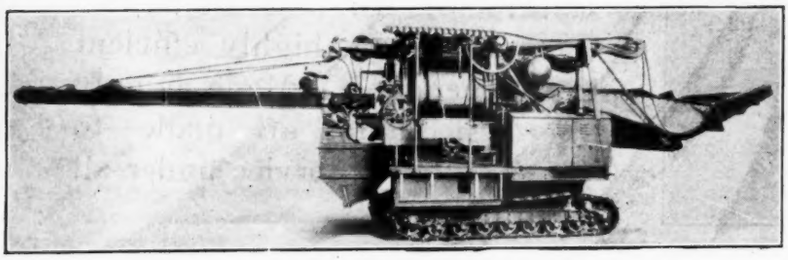
The Koehring Company, of Milwaukee, has recently brought out a 27 E heavy duty paver having a capacity for 7 bags 1:2:3 mix, or 6 bags 1:2:4 mix. Among the features are the following:

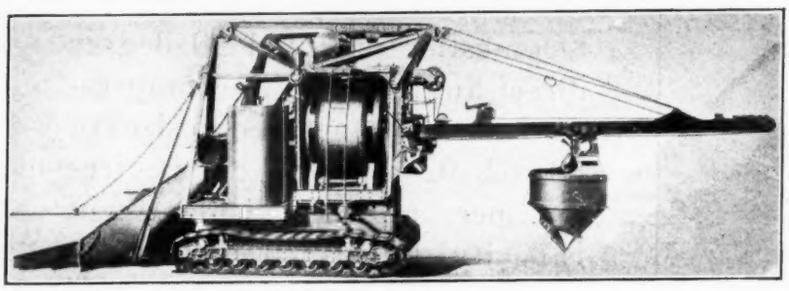
Centralized high-speed control, secured by automatic features, location of operating levers and design of operator's platform.

Automatic high-speed water feed through a trouble-proof balanced valve with power discharge by means of air pressure.

Enclosed operating gear case with gears running in continuous oil bath, connected directed to the motor by a flexible coupling.

Power steering by disconnecting and braking either multiplane.





KOEHRING 27E PAVER.
Above, operating side with upper frame collapsed. Below, opposite side with upper frame extended.

Multiplane width can be reduced from 90" overall to 82" when building half-width roads.

Double, continuous, self-equalizing cable for changing skip, the speed of the skip being timed by taper of cable drum so that throat of skip is not clogged.

Self-operating boom bucket.

Automatic loading action.

Collapsible upper frame for clearing low overhead obstructions. The assembly supporting the water measuring tank can be folded over on a hinge, and the upper steel framework can easily be collapsed and folded down by removing a few bolts and disconnecting the water line. The total height from ground to top of machine can be reduced to 11 ft. 3 in.

This paver will be exhibited in Booth No. 16 at the Good Roads show next month.

NELSON'S SNOW LOADER

The N. P. Nelson Iron Works, of Passaic, N. J., manufactures a snow loader which was used last winter by the New York City Street Cleaning Department. It is mounted on a standard Fordson tractor with wheels provided with staggered cleats. A spiral feeder at the rear of the machine digs the snow and ice for a width of 7 feet and delivers it to the center of the elevator, which consists of steel plate scrapers attached to two endless chains. The scrapers carry the snow and ice through a trough to the top of the elevator and there discharge them into a swivel spout, which has a clearance above the ground of 10 feet, which allows the snow to be piled up in trucks. The feeder loosens all ice and other obstructions and feeds them into the conveyor. The operator stands on a side platform and has within his reach control of all the actions.

The main frame is a long, rigid trussed steed boom through which the conveyor passes. The total height when set up is 15 feet, and when lowered with the boom horizontal, 8 feet 8 inches. Length when lowered 26 feet 3 inches. Speed forward 47 feet per minute, speed reverse 27, 50 and 120 feet per minute. Weight, 9,000 lbs.

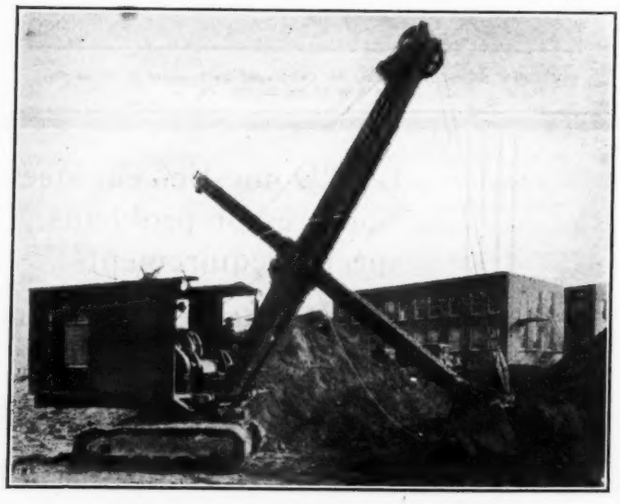
NELSON SNOW LOADER.

This machine has handled six to nine yards of fresh snow per minute. It can be used in warm weather, without any alteration, for loading sand, gravel and cinders.

OSGOOD POWER SHOVELS

The Osgood Company, of Marion, Ohio, manufactures a power shovel designed for operation by gasoline or oil engine or by electric motor. In addition to heavy service as a shovel, it can be used with equal effectiveness as a crane, or clam shell or drag line excavator. The manufacturers call special attention to its strength and ruggedness as well as its efficiency. Only four friction clutches are used in the usual operation of the machine and these are of the outside contracting band type, powerful and reliable. Wire rope crowding mechanism is used. Self starters for the engines. Servo control and clutches and other features, add greatly to the efficiency.

This power shovel is of the full revolving type mounted on continuous threads. All the operating machinery,



OSGOOD HEAVY-DUTY GAS SHOVEL.
With narrow trench type dipper on 23-ft. handle and 22-ft. boom.

Guarantee
Owen Buckets, properly installed and operated, are guaranteed to do a bigger day's work than any other bucket of the same weight and capacity—
—or—
Write your own guarantee!
OWEN BUCKET CO.

Highway

Railroad

Industrial

P. & A. Photos

The Owen Snow Bucket is covered by the Standard Owen Guarantee. To Owen Bucket users, that's enough. To the other fellows, it's an invitation.

Here's the Way to Handle Snow!

Every winter municipalities, industrials, and railroads are confronted with the job of removing snow from streets and tracks. That—or wait for the snow to melt. But the paths of traffic must be kept open.

So crews of laborers leave their regular work, some extras are hired, and they start shoveling. All of which costs money and takes time. Yet, this overhead expense can be reduced.

For here's the way to handle snow this winter!

Put Owen Snow Buckets on the job. They'll do the work. And do it quickly, cleanly, and efficiently—with at least a yard and a half disappearing every time the closing line is overhauled.

Owen Snow Buckets are built right—there is nothing experimental about them. We know their capacity for this work, and we know the money and time they'll save.

That's why we say—*Here's the real way to handle snow!*

We have an interesting folder for you. It tells about the details of this bucket, and shows how the Owen is built. Which is a part of the story we want you to know.

The OWEN BUCKET Co.

1201 Rockefeller Building Cleveland, Ohio

Baltimore Chicago Dallas Los Angeles Minneapolis Philadelphia
Pittsburgh New York Miami Portland St. Louis San Francisco

OWEN CLAMSHELL BUCKETS INSURE A BIGGER DAYS WORK

Owen Buckets

INSURE A BIGGER DAY'S WORK

C O. B. Co.

including the engine or motor, is mounted directly on the unit cast steel center member in accurate and permanent alignment. The power unit is mounted at the rear of the machinery and power is transmitted to a countershaft by a heavy silent chain. The main drum shaft is driven from the counter shaft by a single machine-cut spur pinion and gear. Independent double drums are standard equipment, controlling the hoisting and crowding motions on the shovel and sufficing for all power required for clam shell and drag line service. A third reversing shaft is driven from the drum shaft gear and carries a bevel gear reversing mechanism, controlled by a pair of friction clutches. By using the reversing mechanism in combination with jaw selective clutches to control both swinging and traveling, only four friction clutches are necessary to control the usual digging operations.

Boom and handle are the combination type, built up of oak armored with steel. The main counter weight serves as a fuel tank which holds 75 gallons.

The gasoline engine regularly furnished has 6 cylinders. The regular h.p. is 65, but this can be increased 30 per cent. The boom hoist is of the worm and gear type, self-locking and is mounted directly on the center member casting. The standard dipper has a capacity of a full 29 cubic feet. The overall height of the Osgood power shovel with boom down is only 11 feet 8 inches, so that it can be shipped without dismantling.

The changes necessary to convert the machine from a shovel to a crane, or a clam shell or a drag line excavator, are few, being only those involved in changing booms and fitting the proper buckets. The work can be done in the field in a few hours.

BAY CITY EXCAVATOR, WITH HALF-YARD SKIMMER

NORTHWEST DIESEL SHOVEL

The Northwest Engineering Co., of Chicago, after five years of experimenting and studying on the problem of the use of the Diesel engine as a power for shovel, crane and drag line service, announces that it is ready to supply the Northwest-Cummins Diesel engine. This engine utilizes four cylinders, by which it claims that it eliminates all objectionable vibration. The four cylinders are cast separately, allowing easy removal of either half of the five main bearings and of any cylinder.

It is a real Diesel and not a semi-Diesel. It starts from stone cold without the aid of torches, electric hot spots or similar devices, and runs at a full Diesel compression of 500 pounds pressure, which assures full economy of operation. This, and complete combustion without the use of high pressure air, are accomplished by a novel means of fuel injection. The fuel pressure is only 50 pounds, making possible the use of a small type of needle valves. Instead of coming from a high pressure air compressor, the air comes from the combustion chamber itself on the compression stroke. As operation is cool, the water jackets never approach the boiling point. For starting, a small gasoline engine and an air compressor are provided, the latter charging a small storage tank with a capacity for 10 to 15 starts.

The manufacturers claim that Northwest machines equipped with these engines are operating at a cost of 90 cents a day. They do not claim that the Diesel engine is suited to every class of work, but state that it should be confined to those jobs where the work covers a long period and is continuous and where the fuel is a large item of expense.

BAY CITY ONE-MAN EXCAVATOR

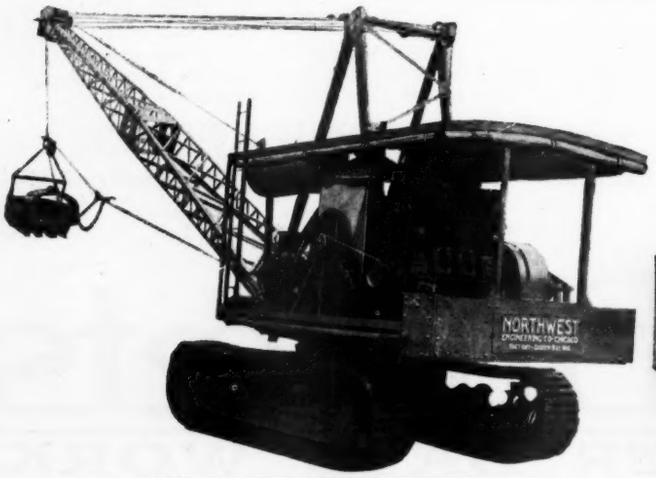
The Bay City Dredge Works, of Bay City, Mich., announces a new Model 4 one-man excavator, the No. 4 model being furnished with skimmer and ditcher scoops, as had previously been done with the ¾ yard Model 16-B.

The skimmer bucket is especially adapted to shallow excavation, as in road and street grading, leaving a smooth grade and filling the bucket on the shallowest cutting; while the trench scoop is used for trenches and for foundations, cellars, etc., the excavator being kept on top of the bank while digging.

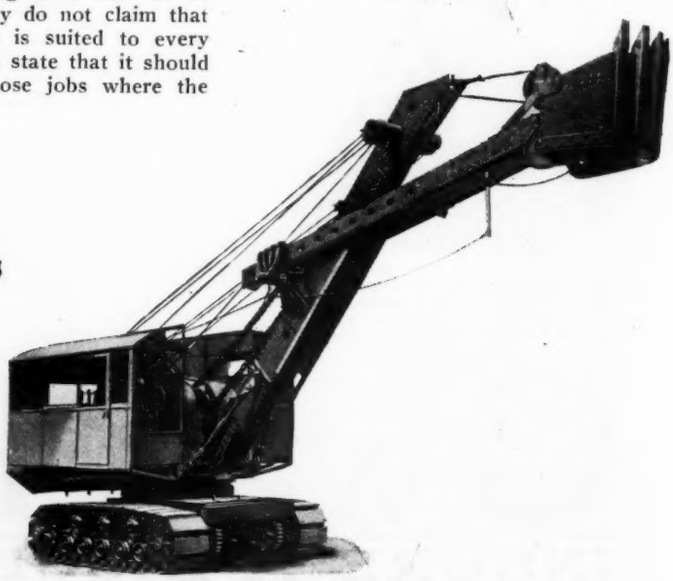
P. H. MODEL 207 EXCAVATOR

The Harnischfeger Corporation, of Milwaukee, has recently designed and put on the market a new model that handles a 1 cu. yd. dragline or clamshell bucket on a 40 ft. boom and has a rated lifting capacity of 33,000 lbs. at a 10 ft. radius, based on 75 per cent. of the tipping capacity.

The shovel dipper is one cubic yard struck measure capacity and may be used on three different size combinations of shovel boom and dipper sticks to give various working clearances.



NORTHWEST DIESEL SHOVEL.



P. & H. EXCAVATOR, MODEL 207

Another Big Surprise

The LORAIN 75

A YEAR AGO • The Center Drive Truck
NOW • A Complete New Shovel

Mounted on the Center Drive Truck

WHEN, a year ago, we announced the new Center Drive Shovel Truck, many doubted the startling claims made for it. They sounded too good to be true. But—every Thew Shovel delivered in 1925 has proved our claims to be really conservative. The Center Drive Truck has measured up to every one of them—and then some. Ask any Center Drive owner.

Now—we announce an entirely new shovel from the truck up. It is a complete redesign, as revolutionary as the Center Drive Truck was a year ago. It has many startling new features, never used before on any shovel. It's the last word in simplicity, power, speed and ease of control. It's the machine you have always hoped for.

See it at the Road Show

THE THEW SHOVEL COMPANY, LORAIN, OHIO

The shovel boom is of the standard P. & H. design of steel construction with the dipper sticks on the outside. The crowding motion is driven through a thimble roller chain from the front drum.

Power is supplied by a single gasoline, electric or Diesel motor of heavy duty tractor type developing 77 H.P. All power is transmitted through cut steel gears with a minimum number of reductions. The two main drums are independently mounted on separate shafts and are controlled by outside band clutches and brakes; the clutches being operated by P. & H. power clutch control. The standard line speed for clamshell and shovel operation is 156 ft. per minute and for dragline operation 116 ft. per minute. The lagging on the front drum may be interchanged for toothed lagging when it is desired to use the shovel attachment. Both the revolving frame and car body frame are of cast steel in one piece. All shafts are turned and ground to micrometer size and all bearings are provided with alemite or pressure cup lubrication. The corduroy frames are heavy steel castings which receive the weight of the machine from two heavy forged steel axles. The treads are non-cloggable and the tread rollers are swiveled to adjust to the irregularities of the ground. All gears are well guarded for protection of machines and operator and the first reduction and travel gears are fully enclosed, running in oil. There are two traction speeds .4 and 1.22 miles per hour, forward and reverse. All steering is controlled from the operator's platform by use of a simple handwheel. The main machinery and operator's platform is fully enclosed in an all-steel cab provided with doors and windows to permit proper care and operation.

MEAD-MORRISON TRACTOR

The Mead-Morrison Manufacturing Co., of Boston, manufactures a crawler tractor for which it claims unusual flexibility, with the tracks hugging the ground and gripping all surface irregularities under all speed and load conditions. Practically the entire weight of the tractor is carried by four heavy spiral springs on the track frame and the lower half of each track is under constant pressure by means of heavy equalizing rollers. Each track is connected by heavy coil springs to an oscillating bar fastened on the front of the engine frame, which allows the front of one track to rise 12 inches higher than the other. Provision is made for taking up slack in the track by adjustment of the front idler.

The normal high speed rating is 5 miles an hour, which is believed to be unusual for a heavy tractor. Under normal operating conditions, the engine develops 36.53 h.p. with 19 additional h.p. in reserve. The engine is an extra reserve, heavy duty Stearnes motor with four 3¾x6½ inch cylinders. There are no friction bearings in the Mead-Morrison "55," but there are 42 sets of ball bearings. The tractor has a turning radius of 6 feet, each track being controlled by a multiple disk clutch. Overall width is 63 inches; height above tracks, 42 inches, or 66 inches overall height; height over radiator 55 inches, and overall length 124 inches.

For night work, a complete electric plant and storage battery is furnished.

LITTLEFORD SQUEEGEE MACHINE

Littleford Bros., of Cincinnati, Ohio, a short time ago placed on the market a squeegee machine for applying bituminous filler to brick or block pavements, wood block floors, etc., or for applying asphaltic seal coats. This squeegee machine consists of a hopper having a capacity of 12 gallons, mounted in two small wheels and pushed by a handle. A quick-acting valve with a control rod on the handle discharges the hopper material in any quantity desired directly in front of a curved wiper blade. The wiper blade is made of heavy rubber and has a spread of 25 inches; it is reversible and adjustable for wear. The machine is light enough to be handled by one man, and when being operated the entire weight is supported on the wiper blade, the wheels being used for support only when turning the machine around or when it is moved on and off a job.

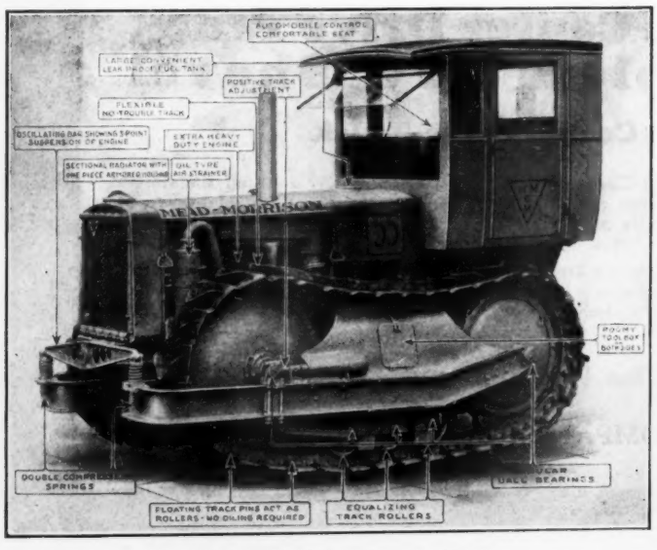
CONCRETE FORM CLAMPS

The M. & M. Wire Clamp Co. of Minneapolis, Minn., manufactures clamps for concrete forms, having recently patented a target, and splicing and column clamps. By the use of wedges in the splicing clamps, the contractor can use either surfaced or rough lumber of the same nominal size on the same job, the wedge having a ¾-inch take-up. By use of the splicing clamps, shores and other members of scaffolding and forms can be built up of two or more timbers, of any length timber available, without the use of nails. The clamps are placed by sliding them on to the two timbers when placed in position and driving home wedges, and are quickly removed by driving out the wedges and thus releasing the clamp. Similar wedges are used with the column clamps. The M. & M. targets are devised for levelling concrete, permitting pouring the concrete and levelling it by the spotting method, or screeding the concrete with a straight edge.

CONCRETE CRIBBING

The Federal Cement Tile Co. of Chicago manufactures a cribbing unit consisting of two members, a face member or stretcher and an anchor member or header, which are combined in the construction of a wall having the appearance of ashlar masonry. The headers are not exposed on the face of the wall but are securely attached to the rear of the stretchers by arrangement of connecting plugs.

The stretchers are 6 feet long, 12 inches high and 4½ inches thick, and are equipped at each end with an anchor lug projecting 6 inches to the rear for connection with the headers. The headers are Y shaped with a stem and legs 8"x4" in section and an enlarged base or anchor fitted with two ¾-inch round bars which fit into holes in the lugs of the stretchers. In laying, the header is


AUTOMOBILE CONTROL COMFORTABLE SEAT
LARGE CONVENIENT LEAK PROOF FUEL TANK
POSITIVE TRACK ADJUSTMENT
FLEXIBLE NO-TROUBLE TRACK
OSCILLATING BAR SHOWING 3 POINT SUSPENSION OF ENGINE
EXTRA HEAVY BUTT ENGINE
SECTIONAL RADIATOR WITH ONE PIECE REMOVABLE HOUSING
OIL TYPE AIR STRAINER
MEAD-MORRISON
ROOMY TOOL BOX OR BOTTLES
DOUBLE COMPRESSION SPRINGS
FLOATING TRACK PINS ACT AS ROLLERS - NO OILING REQUIRED
EQUALIZING TRACK ROLLERS
CAR BALL BEARINGS

MEAD-MORRISON "55" TRACTOR.

LAYING "FEDERAL" CONCRETE CRIBBING UNITS.

Merry Christmas, 1925

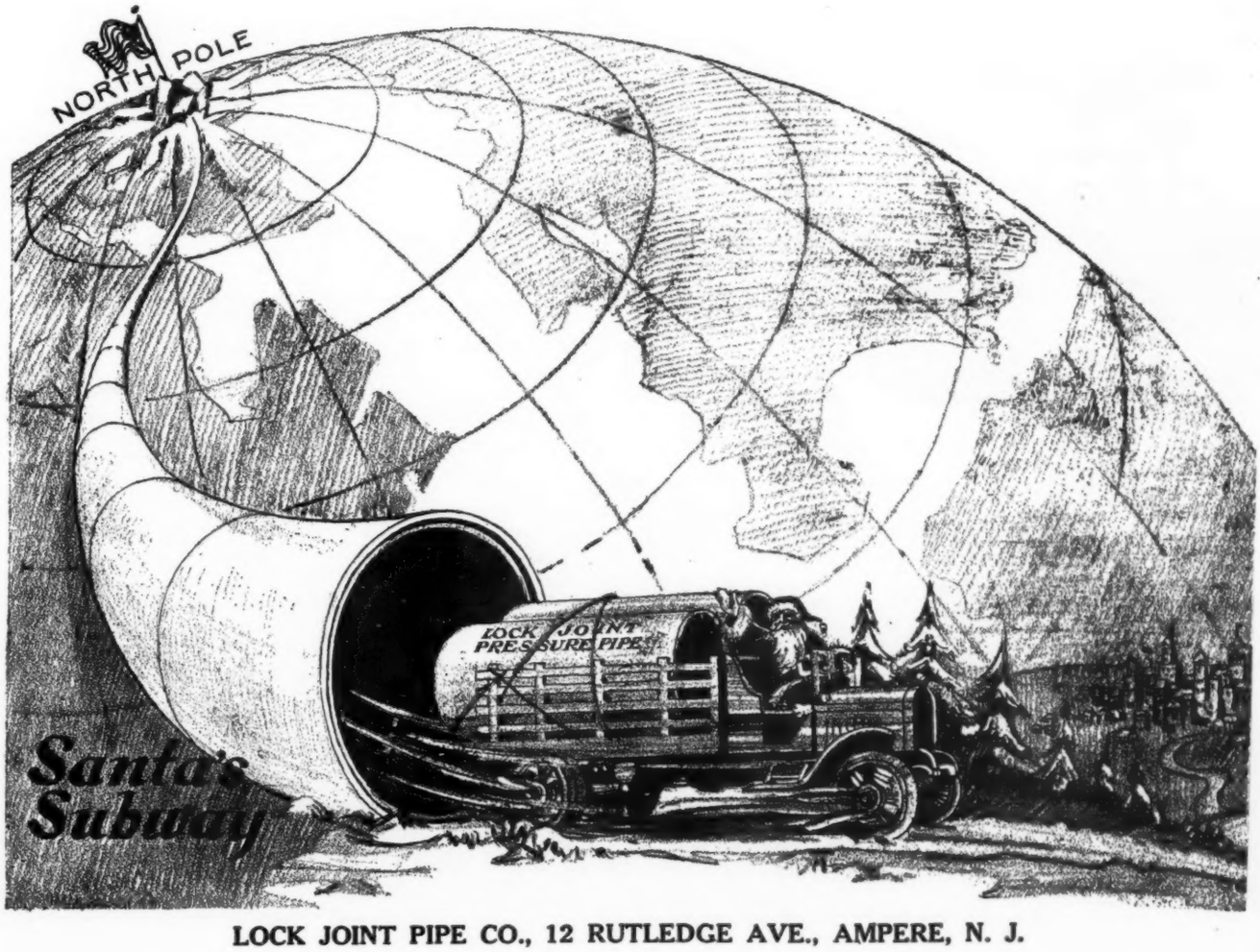
THE Patron Saint of December, or of any other month in the year, can bring a community no more satisfactory gift than a Lock Joint Reinforced Concrete Pressure Pipe line.

It will prove to have the Highest Carrying Capacity to serve fathers, sons, grandchildren and great-grandchildren in the same unfailing and efficient manner as the day it was first put in service.

May all of your troubles be as few and small as those of Lock Joint Pipe, your ways as smooth, your adaptability as flexible, your efficiency as easily kept in condition.

In fact, *Merry Christmas,* 1925!

LOCK JOINT
Reinforced
Concrete Pipe
Pressure - Sewer - Subaqueous



LOCK JOINT PIPE CO., 12 RUTLEDGE AVE., AMPERE, N. J.

connected to the adjacent stretchers of alternate courses and the spread legs at the rear provide an anchorage for the structure; the ends of the legs of one course resting on the ends of the legs of the course below. The wall, therefore, forms a stable interlocked construction.

LIBERTY VALVE OPERATOR

The Liberty Electric Corporation, of Stamford, Conn., manufactures what it calls the Liberty valve operator, the purpose of which is to mechanically operate valves where hand operation is not desirable because of slowness, amount of labor required, hazard of live steam, flooding conditions, or inaccessibility to the valves, etc. The operator is electrically controlled, and consists in the main of motor, motor shaft, worm, drive shaft, magnetic clutch, train of gears and limit switch. Control of the operator is accomplished by one or more control stations either manually or relay operated. Colored indicator lamps at these stations show whether the valve is open, closed or in travel. The limit switch instantaneously disengages the motor from the main shaft and thus stops the valve at exactly the desired position. There is also an overload cut-out adjusted to the straining point of the valve stem, and serves as added insurance in emergency conditions such as foreign material in the valve, wrong adjustment of limit switch, etc. The motors used are specially designed for this purpose with high torque, series wound, and fully enclosed.

OPERATOR MOUNTED ON VALVE.

INDUSTRIAL NOTES

HARNISCHFEGER NORTH CAROLINA BRANCH

Harnischfeger Sales Corporation, distributor for Harnischfeger Corporation, announces the location of a branch office at Charlotte, N. C., in the Independence Trust Bldg., with W. J. Henry, district manager, in charge.

LINDE AIR PRODUCTS CO.

At the last meeting of the Board of Directors of the Linde Air Products Company, G. W. Mead, formerly president, was elected chairman of the Board; W. F. Barrett, formerly vice-president, was elected to the presidency; R. R. Browning was elected vice-president in charge of sales activities, and J. A. Rafferty, vice-president in charge of engineering, manufacturing and research.

PREST-O-LITE CO.

At a recent meeting of the Board of Directors of the Prest-O-Lite Co., Inc., M. J. Carney, formerly president, was elected chairman of the Board; William F. Barrett, formerly vice-president, was elected to the presidency; Ralph R. Browning was elected vice-president in charge of acetylene sales activities, and R. J. Hoffman was re-elected vice-president in charge of storage battery and automotive divisions.

CLIMAX ENGINEERING CO. REPRESENTATIVE.

The Climax Engineering Co., of Clinton, Ia., announces the appointment of T. L. Keeling as sales representative, with offices at 657 Leader Bldg., Cleveland, Ohio. Mr. Keeling will have full charge of the district including Ohio, western New York and western Pennsylvania.

READING IRON CO. REPRESENTATIVE

The Reading Iron Co., of Reading, Pa., has appointed Clyde L. Jones as sales agent in the St. Louis territory, with headquarters at 1819 Railway Bldg., St. Louis. Mr. Jones formerly had a similar position with the Interstate Pipe Co.

REPUBLIC MOTOR TRUCK VICE-PRESIDENT

J. C. Haggart, Jr., has been elected vice-president of the Republic Motor Truck Co., Inc., of Alma, Michigan. He has been with this company for the past nine years as chief engineer and asistant to the president.

OSGOOD CO. SALES DEPARTMENT

The Osgood Co., of Marion, O., announces that T. L. Pitts, sales representative for the company at Charlotte, N. C., has been promoted to be division sales manager in charge of sales in the South Atlantic seaboard territory. He has appointed M. D. Moody, of Jacksonville, Fla., and I. W. Phillips, of Tampa, Fla., to represent the Osgood Co. in their respective territories.

BAY CITY AT THE ROAD SHOW

The Bay City Dredge Works, of Bay City, Mich., announces that because of the great demand for space at the Chicago Road Show, not all exhibitors were able to obtain space on the ground floor and this company's exhibit will be found in the balcony; but in addition to this, the company has arranged to exhibit a model 16B convertible Bay City crane excavator, equipped with a gasoline engine and skimmer trench scoop of three-fourth yard capacity, in an open lot at the corner of 16th St. and Wabash Ave. This is on the same side of the street in the same block as the Coliseum, and thus convenient for contractors who wish to see the machine in action. Actual digging will be done which, of course, would not be possible in the Coliseum.

It is understood that several other machinery manufacturers will have exhibits at the same place and this will undoubtedly serve to attract contractors to this open-air exhibit.

1925 WITH THE BUCYRUS CO.

The Bucyrus Co., manufacturers of excavating machinery, with plants at South Milwaukee and Evansville, give as the four most outstanding achievements for the year 1925: (1st). The announcement of a 4-yd., full revolving shovel for quarry and mine service, called the 120-B. (2) Application of caterpillar mounting to its big Class 320 drag line, a machine weighing nearly 400 tons and equipped with an 8 cu. yd. dipper. (3) Introduction of electric shovels driven by 3-shunt motors with Ward-Leonard control. (4) A dipper dredge even larger than those used in constructing the Panama Canal is at present under construction. It is of 1,200 h. p., driven through electric motors by Diesel engines. As far as is known, this is the only large dipper dredge to be driven by Diesels.

RECENT PUBLICATIONS

(*Continued from page 46*)

WESTINGHOUSE CO.'S ACHIEVEMENTS

"The Engineering Achievements of the Westinghouse Electric & Manufacturing Co. for the year 1925," is the title of a 42-page book prepared by H. W. Copes, assistant director of engineering of the company, which will be ready for distribution after January 1st.

SNOW REMOVAL BOOK

Under the above title the Caterpillar Tractor Co. has published a 52-page book dealing with results of a four months survey of the snow removal field, giving facts and figures justifying expenditures for snow removal, and describing equipment. Handsomely printed and illustrated.

DELERY STRAINER SYSTEM

E. F. Delery of the New Orleans Sewerage and Water Board, describes, in a 12-page folder, with detail drawings, the strainer system designed by him for the New Orleans filters.

Clearing the streets at Washington, D. C

The Fordson powered shovel replaced 20 men

The rotary brush sweeps snow from sidewalks, streets and skating rinks

Prepare for Blizzards

THE splendid success which many American cities have had with Fordson equipment for clearing streets and sidewalks, after heavy snows, has won the endorsement of users everywhere.

Fordson powered graders or V-shape snow plows quickly open drifted streets for vehicular traffic. Sidewalks and street crossings are kept clean by Fordsons equipped with rotary brushes.

The unrivalled economy and reliability of the Fordson is particularly well shown in actual performance on work of this character.

FORDSON TRACTOR

$495

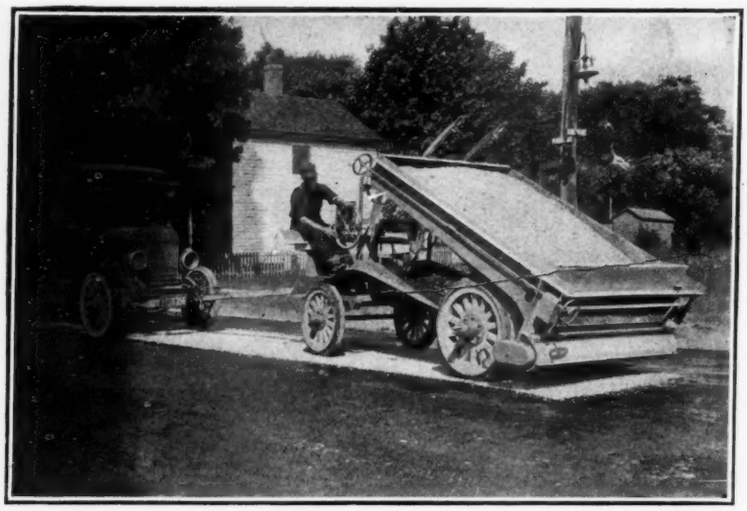
F. o. b. Detroit

Authorized Ford Dealers are ready to demonstrate the efficiency of Fordson snow removal equipment. There is no obligation.

Ford

CARS TRUCKS TRACTORS

PERMIT US TO INTRODUCE THE LATEST ADDITION



To Our Line of
Road Building Equipment
The

Reliance Chip and Sand Spreader

for covering oiled surfaces or spreading small stone on re-surfacing work.

Spreads 8 feet wide, places the material AHEAD OF THE WHEELS, SO THEY DO NOT RUN IN THE OIL. It can be operated with a FORDSON or any truck and 2 units will cover as fast as oil can be applied by a distributor.

We also manufacture and offer a complete line of Road Building, Quarry and Gravel Handling Equipment, including Crushers, Elevators, Screens, Bins, etc.

Let us show you how this equipment will save money for you.

Send for Catalogue and prices.

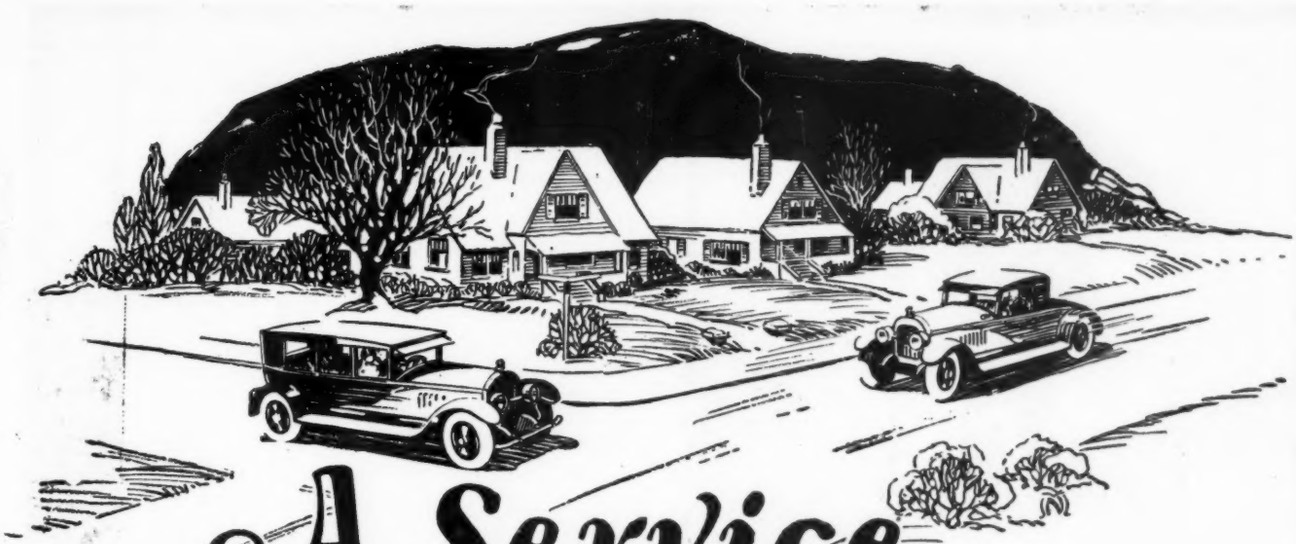
UNIVERSAL ROAD MACHINERY CO.

141 MILK ST., BOSTON **KINGSTON, N. Y.** **114 LIBERTY ST., NEW YORK**

This KEROSENE TOOL HEATER saves $465.00 in 165 working days

Detailed Cost and Performance data on request.

HAUCK MANUFACTURING CO., 147 Tenth Street, Brooklyn, N.Y.



A Service for Your Community

THE quality of any road depends on more than the quality of the material used in building it. The *grade* of asphalt or road oil used must be suited to the nature of the road. And even when the material is exactly suited to the requirements, the work must be done in just the right way, or there is a possibility of unsatisfactory results.

Stanolind Paving Asphalt and Standard Asphalt Road Oil will always give the highest satisfaction when they are correctly used. But because of the fact that contractors sometimes choose the wrong grade of material, or do not take the necessary precautions in laying it, we urge that all communities which are considering road improvement work during the coming year, shall take advantage of the services of our road engineers.

Our engineers are thoroughly trained and experienced men who have made the study of roads and road materials their specialty. They will be glad to make a survey of the roads in your community, without charge, and recommend the grades of asphalt or road oil that will give the best results. They will also furnish the contractor with detailed instructions for preparing the road and applying the material recommended.

To arrange for a survey, phone or write our nearest branch

STANDARD OIL COMPANY
(INDIANA)

General Offices: 910 S. Michigan Avenue CHICAGO, ILLINOIS

ILLINOIS
Chicago
Decatur
Joliet
Peoria
Quincy

INDIANA
Evansville
Indianapolis
South Bend

KANSAS
Wichita

IOWA
Davenport
Des Moines
Mason City
Sioux City

S. DAKOTA
Huron

MICHIGAN
Detroit
Grand Rapids
Saginaw

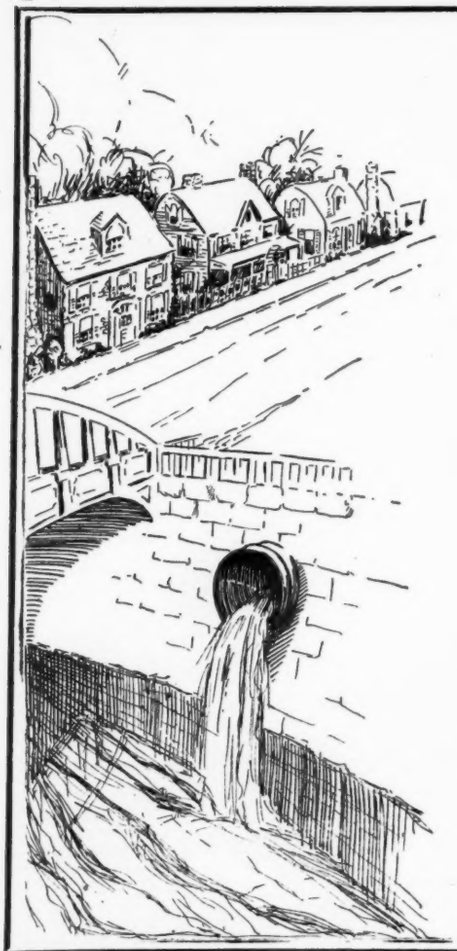
N. DAKOTA
Fargo
Minot

WISCONSIN
La Crosse
Milwaukee

MINNESOTA
Duluth
Mankato
Minneapolis

MISSOURI
Kansas City
St. Joseph
St. Louis

Our more than thirty years' experience enables us to select materials and design equipment which will render the best service. The number of Buffalo-Springfield Rollers now in use is not equalled by that of any other make of roller produced in America or abroad.
Manufactured in all types and sizes, steam and motor. Get full particulars regarding them.
The Buffalo-Springfield Roller Co.
Springfield, Ohio
BUFFALO-SPRINGFIELD ROLLERS



ECONOMY on "MAIN STREET"

Community pride is a big asset to any city or village. The desire to impress the stranger within your gates is a very natural and laudable one. It is false economy to let your "Main Street" present an unsightly appearance through lack of perfect drainage, when the NEWPORT GENUINE OPEN HEARTH IRON CULVERT offers such an economical and perfect solution of your problems.

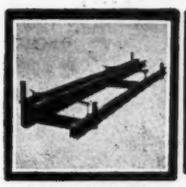
Consensus of engineering opinion has placed the corrugated metal culvert in the van.

Your drainage problem therefore resolves itself into a question of what brand of Corrugated Metal Culvert to install.

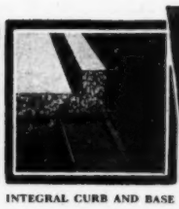
In selecting the **NEWPORT "GENUINE OPEN HEARTH IRON" CULVERT** you are getting a sheet metal which is the result of years of experience of the Newport Rolling Mill Company and their highly trained staff of Metallurgists, together with the most modern equipment. When a series of actual tests made clear the greater lasting qualities to be secured from our Open Hearth Iron by the addition of copper, the necessary amount of this metal was added to produce the incomparable Alloy that we offer today in our culverts—guaranteed to be 99.875% PURE IRON COPPER ALLOY.

The maintenance of a culvert is less than that of an open drain, and the difference in original cost is soon absorbed. At no time does the culvert present a hazard to traffic. The distinct advantages of a corrugated metal culvert are its rust resisting qualities, and the fact that the corrugations give remarkable strength for the weight of the metal. The economy of the Newport Culvert is also appreciable when compared with the installation of concrete or clay pipe which demands laying in a concrete casing to prevent collapse under heavy traffic.

THE NEWPORT CULVERT CO
Newport Kentucky


CURB AND GUTTER

CURB


INTEGRAL CURB AND BASE

BATTERED CURB

SIDEWALK

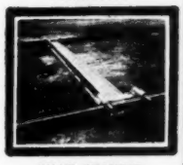
ROAD FORMS

FINISHING MACHINES

JOINT MACHINES

STRIKEOFFS

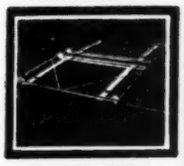
BATCH BOXES


TRAIL GRADERS

BATCHER

SUBGRADE TESTERS

TRAILER BATCHER BIN


TRAVELING BRIDGE

STATIONARY BINS

CAR UNLOADERS

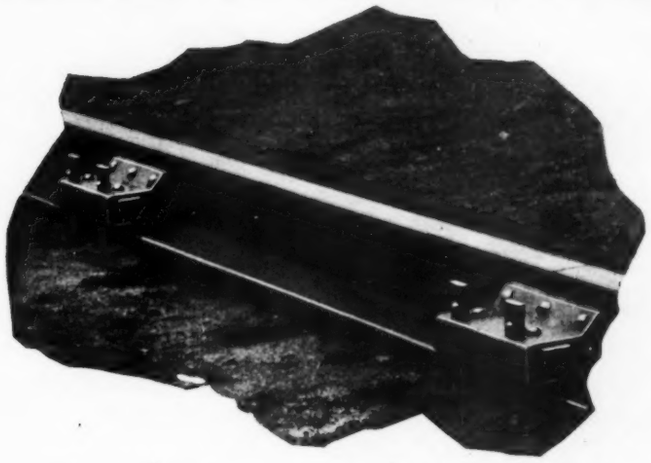
MANHOLE FORMS

MORTAR BOARD

SEWER FORMS

TOOL BOXES

PIPE FORMS



The Final Result of the Most Exhaustive Research Ever Attempted in Road Form Development.

See It At Booth No. 24 Chicago Road Show

THE HELTZEL "Armor Plate" Steel Road Form is the result of sixteen years of engineering research—16 years of concentration on steel form construction—and during those sixteen years we have met and overcome every conceivable kind of obstacle the contractors have encountered.

The sum total which HELTZEL Steel Forms have saved highway departments, municipalities and contractors would run into the millions. And each year this huge sum increases as thousands of new satisfied customers are added to our long list.

The HELTZEL "Armor Plate" Steel Road Form is the result of individual study of road form performance on every kind of subsoil—on the solid rock subgrades of the Rockies—on the clay subsoil of the Middle West—on loams and sand dunes wherever found. State highway engineers, assistants, inspectors, contractors and form setters advanced opinions and suggestions.

And the HELTZEL Improved "Armor Plate" Steel Road Form is the result—a lock joint 10 inches long, to prevent any possible rail deflection under the heaviest types of modern road building equipment—a road form which is easier to set and which will give you longer and better service than any other form.

HELTZEL Improved "Armor Plate" Steel Road Forms have the endorsement of the best known contractors and engineers everywhere.

The Noll Construction Company, Lexington, N. C., have 32,300 feet; F. C. Lytle, Sioux City, Iowa, has 32,460 feet; R. G. Lassiter & Company, Raleigh, N. C., have 21,504 feet; Stryker Transportation & Contracting Co., Trenton, N. J., have 14,340 feet; Ambler Davis Company, Philadelphia, Pa., 26,430 feet; Union Paving Company, Philadelphia, 75,340 feet, and the North Carolina State Highway Department 11,708 feet of Heltzel Steel Forms.

These are only a few of the hundreds of large users of HELTZEL Forms.

They are used the world over.

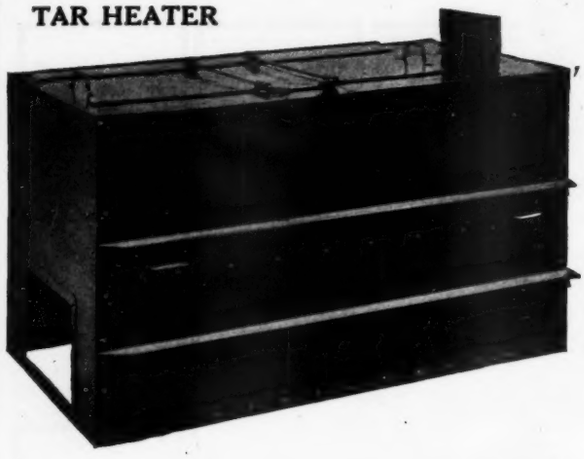
Write today for new Road Form Bulletin just off the press.

The Heltzel Steel Form & Iron Co.
Warren, Ohio

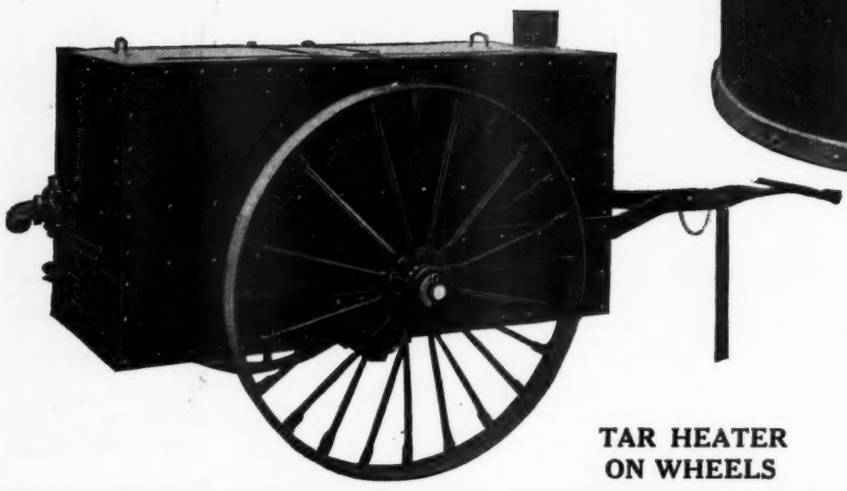
Write Us About Any of the Products Shown in the Border

HELTZEL

TAR HEATER



ASPHALT and MASTIC HEATER



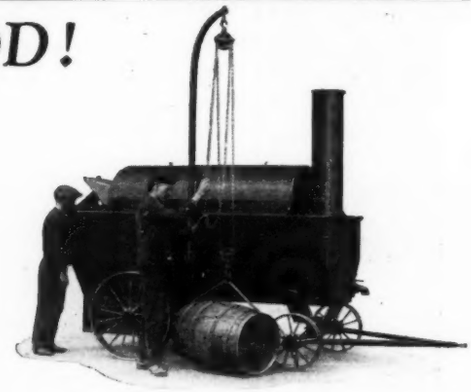
TAR HEATER
ON WHEELS

Est. **F. H. EVANS**
31-33-35 HEWES STREET
BROOKLYN, N. Y.

Made Good—*to MAKE GOOD!*

Littleford Tar and Asphalt Heaters best meet the conditions of road work where hot materials are a part of the job, because among the seven types and sixteen capacities we manufacture there is a heater of a type and size just fitted to do the work most efficiently and economically. Begin your 1926 road work right by sending for our catalogue now. It will make selection easy and profitable.

Our catalogue shows them all. Write for it.



THE SIGN OF LB A GOOD HEATER

At the
ROAD SHOW
MAIN
COLISEUM
Booth Number
E-9 and 10

LITTLEFORD BROS.
455 East Pearl Street
CINCINNATI, OHIO

LITTLEFORD
TAR AND ASPHALT
HEATERS

"My American LaFrance Commercial Truck will outpull any other on the job"—

Says Chicago Contractor

You will find American-LaFrance Commercial Trucks on the road in action. This is due to the fact that they are built completely in our own plant. The same engineering organization that has produced motor driven fire apparatus for 90% of America's cities has designed American-LaFrance Commercial Trucks.

Chicago, Illinois.

American-LaFrance Fire Engine Co.,
3830 S. Michigan Ave.,
Chicago, Ills.

Attention Mr. J. A. Bell.

Gentlemen:

My big American LaFrance truck that I use in material hauling will out pull any other truck I have seen on the jobs. With ten and fourteen ton loads, I go where the other fellowscan't, and do not get stuck.

Yours very truly,

Anthony Calzaretta

A. Calzaretta
7006 S. Wood St.,
Chicago, Illinois.

AMERICAN-LAFRANCE FIRE ENGINE COMPANY, INC.

COMMERCIAL TRUCK FACTORY
BLOOMFIELD, N. J.

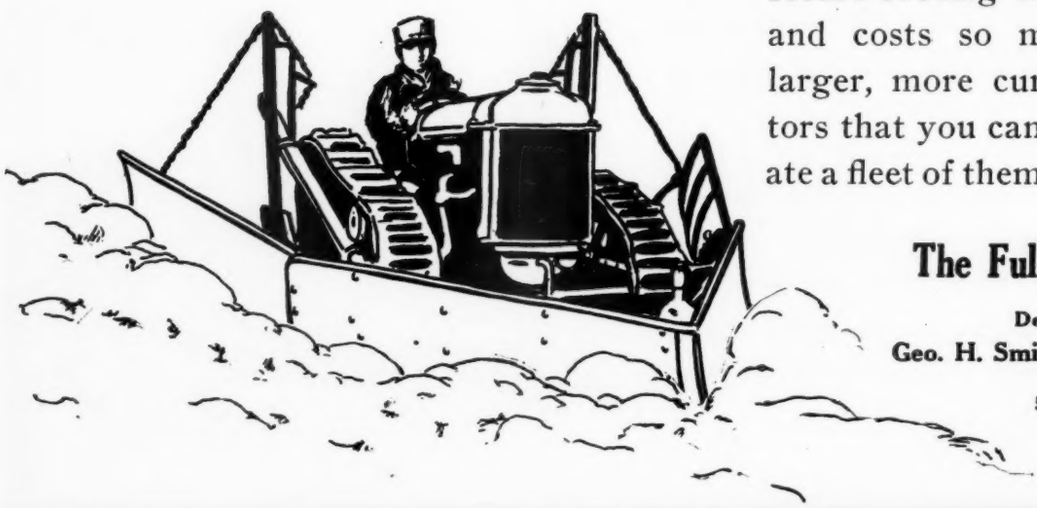
NEW YORK OFFICE
FISK BLDG., BROADWAY AT 57TH ST.

FIRE APPARATUS FACTORY, ELMIRA, N. Y.

"The Manufactured Quality Truck"

For Economical Snow Removal

Trackson
Full-Crawler for Fordsons



Trackson equipped Fordsons have plenty of power and weight to buck heavy drifts, plenty of speed for light powdery snowfalls, crawler traction to give secure footing on ice and snow, and costs so much less than larger, more cumbersome tractors that you can own and operate a fleet of them for less money.

The Full-Crawler Co.

Department of
Geo. H. Smith Steel Castings Co.
503 CLINTON STREET
MILWAUKEE, WIS.

"Before I let you in—

how many engines has your shovel?"

Do you remember how the one-engine steam shovel—with its "crowd" and "swing" driven through friction clutches—was pushed out of the field years ago?

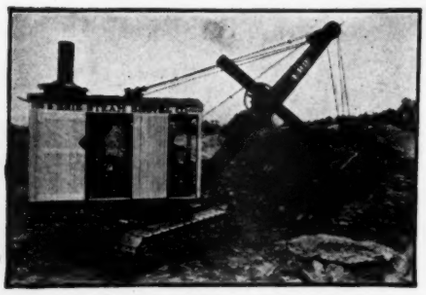
After a contractor had once tried the simpler and faster machine with three direct-connected engines, he wouldn't even listen to the salesman offering a one-engine shovel.

No contractor wanted the bother and expense of reversing friction clutches. Independent sets of crowding and swinging engines made every kind of digging go smoother and faster.

Direct control pays just as well today

An ERIE Shovel has no shafts, gears and clutches running all the time, wearing fast and wasting power—

Just three sets of direct-connected engines, that give INSTANT RESPONSE at the touch of throttle levers. The ERIE'S snappy action earns more money.



Much harder digging can be done

When the ERIE hits hard material, or a big boulder, the operator doesn't "baby" the hoist to keep from killing the engine.

Instead, with the hoist throttle wide open he crowds the dipper in and out, to loosen the boulder—also swings, to pry sideways. Getting the full power of hoisting, crowding and swinging engines, all together. *The ERIE'S "crowd" and "swing" add more power, instead of stealing power from the hoist.*

Buy the shovel that *gets the work done.* Write us about the excavating you have to do, and we will tell you what E ..ES are doing on similar work.

ERIE STEAM SHOVEL CO., Erie, Pa., U. S. A.

Builders of ERIE Shovels, Cranes, Ditchers, Draglines, Trench Hoes, etc.
Branch Offices: Boston, New York, Philadelphia, Pittsburgh, Atlanta, Chicago

ERIE Revolving Shovels

Representatives throughout the U. S. A.

AMERICANS SHOULD PRODUCE THEIR OWN RUBBER . . . H.S. Firestone

Motor leads of 400,000 C.M. Wire to 200 horse power 440 volt motor for running ammonia compressor. First two leads freshly taped, third lead was taped 6 years ago.

High Tension Joints Made Permanently Safe

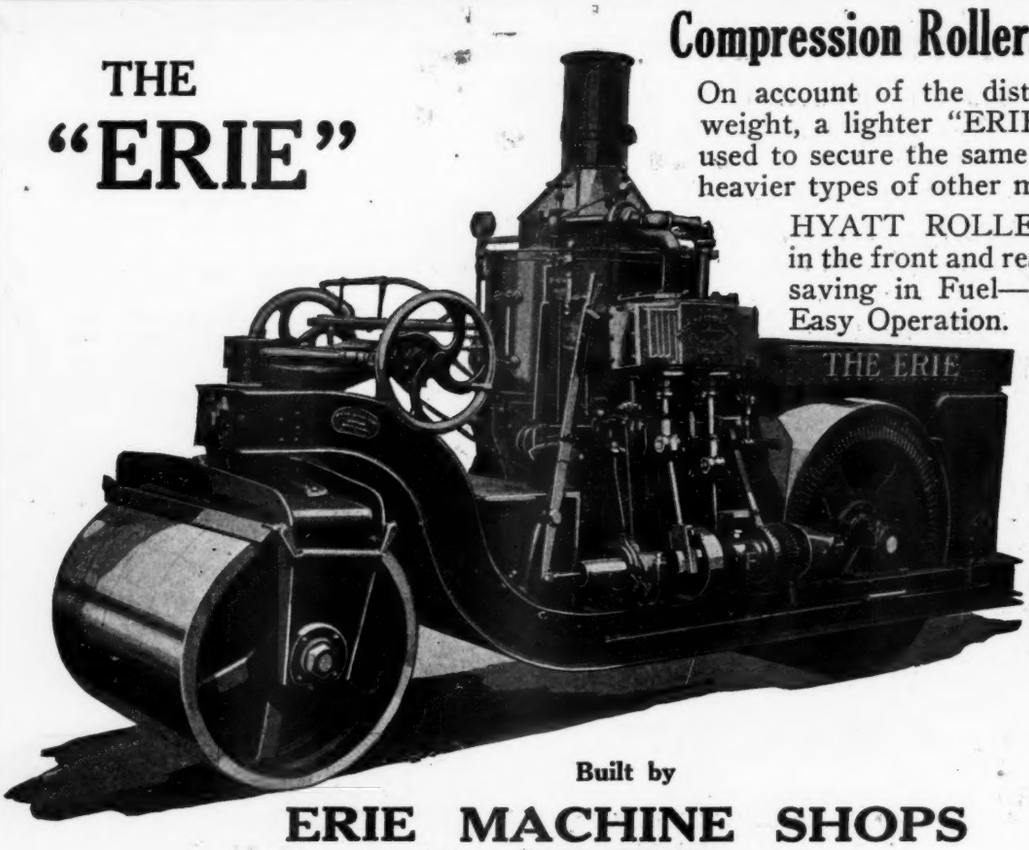
Dirt, oil, moisture, heat and cold cannot destroy the insulating and holding qualities of Firestone Friction Tape. In dielectric properties, adhesion, tensile strength and durability, it conforms to standards more rigid than those of the Government and the largest electrical manufacturers in the industry. Its easy application makes it the choice of electricians, mechanics and all small and large users everywhere.

Sold in bulk or in the new handsome display carton, Firestone Friction Tape is a steady reliable builder of profits and prestige. Write for discounts, prices and specifications. Address the nearest Firestone Branch or the Home Office at Akron, Ohio.

Firestone
FRICTION TAPE

The Mark of Quality

THE "ERIE"



Compression Rollers of Quality

On account of the distribution of the weight, a lighter "ERIE" roller can be used to secure the same compression as heavier types of other makes.

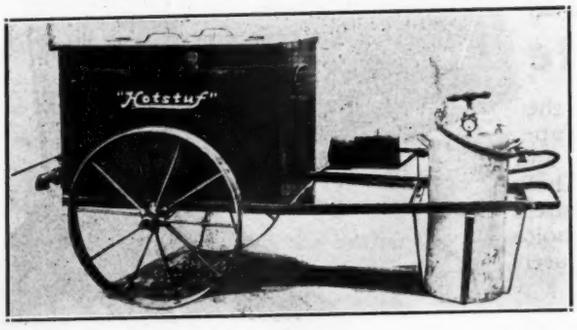
HYATT ROLLER BEARINGS in the front and rear rolls effecting saving in Fuel—Less Friction—Easy Operation.

Built by the oldest Tandem Roller Builders in the country, with thirty-eight years' experience and maintaining the same management throughout this time.

Built by

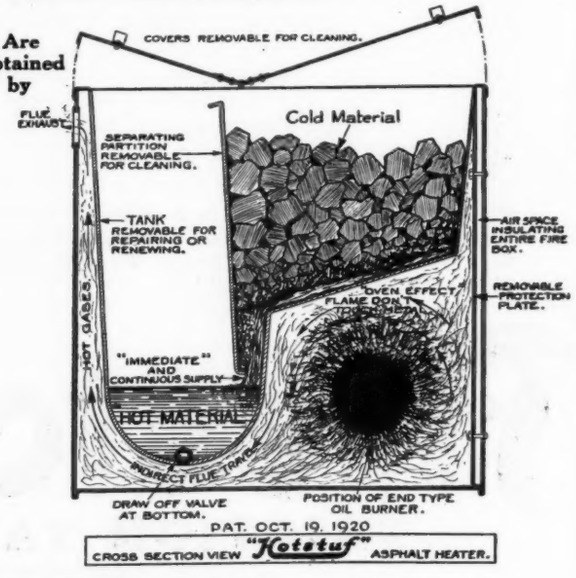
ERIE MACHINE SHOPS
ERIE, PENNA.

"HOTSTUF" PATROL ASPHALT HEATER



—QUICKER ACTION
—GREATER CAPACITY
—FUEL ECONOMY

Are Obtained by


COVERS REMOVABLE FOR CLEANING.
FLUE EXHAUST
Cold Material
SEPARATING PARTITION REMOVABLE FOR CLEANING.
TANK REMOVABLE FOR REPAIRING OR RENEWING.
AIR SPACE INSULATING ENTIRE FIRE BOX.
OVEN EFFECT FLAME CONTACT
REMOVABLE PROTECTION PLATE.
HOT GASES
"IMMEDIATE" AND CONTINUOUS SUPPLY
HOT MATERIAL
INDIRECT FLUE TRACK
DRAW OFF VALVE AT BOTTOM.
POSITION OF END TYPE OIL BURNER.
PAT. OCT. 19, 1920
CROSS SECTION VIEW "Hotstuf" ASPHALT HEATER.

The ELEVATED MELTING CHAMBER

As fast as the asphalt melts it runs from the elevated melting chamber down into the storage chamber, thus producing an immediate and continuous supply of hotstuff, practically eliminating sediment and coking in the melting chamber.

The 50-gallon "Hotstuf" Heater will melt approximately 5600 lbs. of asphalt in 8 hours, fuel consumption approximately 1 gal. per hour.

The 100-gal. "Hotstuf" Heater will melt approximately 8000 lbs. of asphalt in 8 hours, fuel consumption approximately 1½ gal. per hour.

MOHAWK ASPHALT HEATER CO.

56 WEAVER STREET PRICES AND FURTHER DATA ON APPLICATION **SCHENECTADY, N. Y.**

Socony Truck Entering Holland Tunnel with Standard Asphalt Filler for Granite Block Pavement

STANDARD ASPHALT PAVING FILLER

Delivered ready for use

IN recent years many municipalities have adopted Asphalt Filler for joints in granite block pavement.

The first method of delivering the Asphalt Filler was in wood barrels or sheet iron drums. This necessitated the removal from barrels, and cutting the filler into pieces so that it could be easily lifted into storage tanks on work. After this it required heating to bring it to a condition where it could be mixed with sand for application to the joints.

It was found that this method not only was inefficient, but costly. With the aim of assisting the engineer and contractor wherever possible, the Standard Oil Company of New York arranged for the construction of tank trucks of 1,000 gallon capacity, and adopted the plan of delivering the Asphalt Paving Filler hot in bulk in these tank trucks to kettles on job at a temperature from 300° F. to 325° F. In this state the filler was ready for mixing with hot sand without pre-heating.

We have used this method of delivering Asphalt Filler in the City of New York and other sections, with conspicuous success.

It enables the contractor to handle his work efficiently, complete his job faster and open the street sooner for traffic.

SO SOCONY ASPHALTS AND ROAD OILS

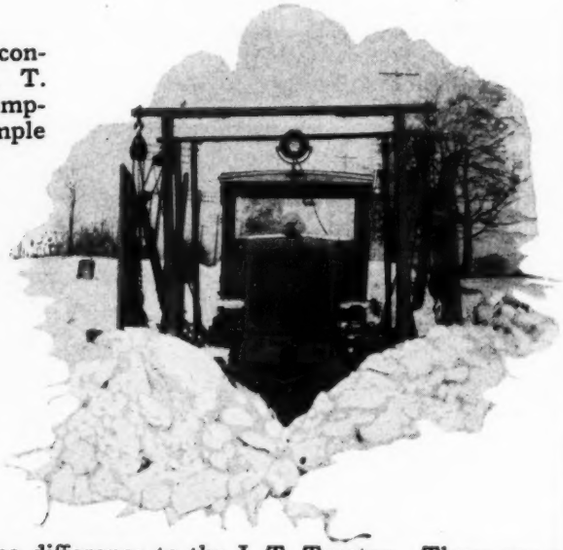
Further specifications and particulars furnished on request

STANDARD OIL CO. OF NEW YORK
26 Broadway

JT TRACTORS

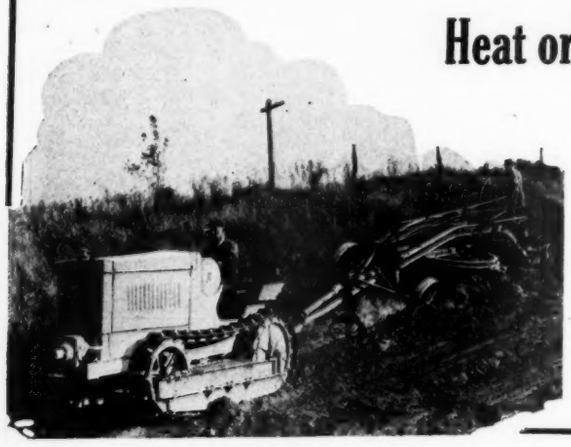
—In Winter
Through Deep Drifts
of Snow

You will be interested in the economy and dependability of J. T. Tractors. The fuel and oil consumption is low, the extremely simple design, relatively few parts, and excellence of construction, make it easy to operate and inexpensive to keep in repair.



—In Summer
for
Heavy Road Work

Heat or Cold



Make no difference to the J. T. Tractor. There are a thousand and one jobs to keep it busy the year 'round.

Write for "S" folder.

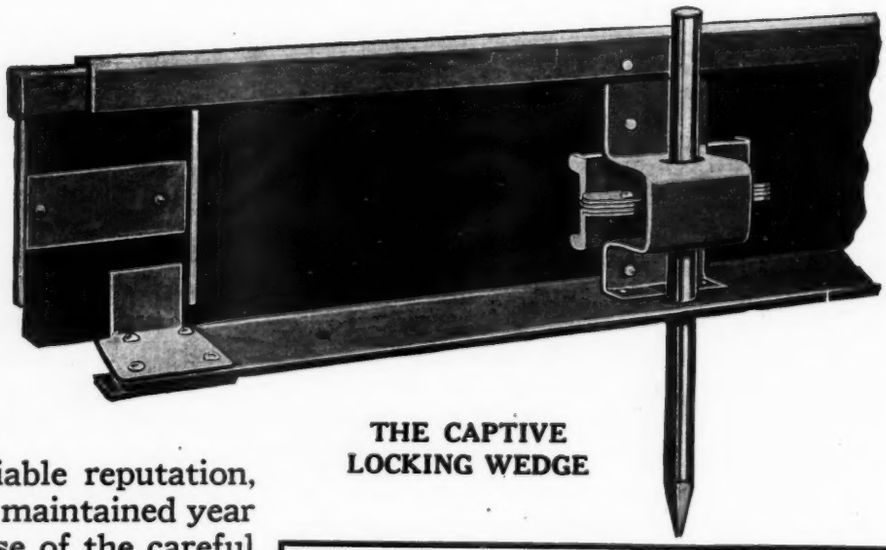
The J. T. Tractor Co.

East 179th Street and St. Clair Cleveland, Ohio

The Last Word in Steel Forms

for

Concrete Roads



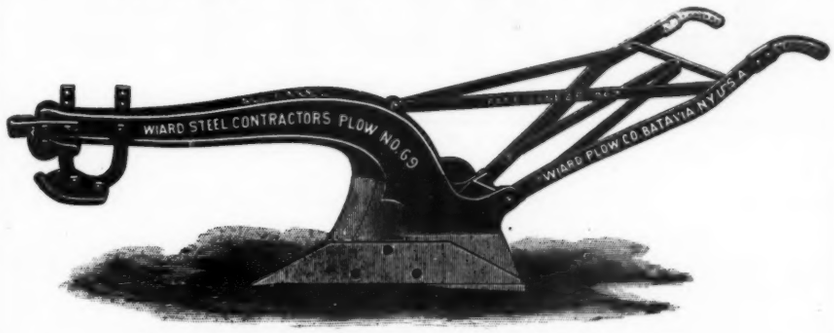
THE CAPTIVE
LOCKING WEDGE

HOTCHKISS Steel Forms are now in universal use on thousands of road jobs. They have attained an enviable reputation, and this is being maintained year after year because of the careful mechanical construction, practical and efficient designs, superior quality of steel, prompt and unequaled service.

HOTCHKISS
STEEL PRODUCTS CO., Inc.
BINGHAMTON, N. Y.

Write for General Catalog and Bulletin on E-Z Form Construction

WIARD Two-In-One PLOW



No. 69 (All Steel) Contractors' Plow, Landside View

For tearing up cobblestones and macadam. By simply removing the steel wing below the mold-board, it can be used as a perfect rooter or pavement plow. The Wiard does the work of both and means a less investment and keeping in stock extra parts for one plow only.

Light and Strong.

Meet us at the Road Show and give us your order.

Write for descriptive literature.

Wiard Plow Co. **Batavia, N. Y.**

ASK THE MAN WHO USES ONE

HE WILL SAY

THE "BULL DOG" SHOVELS

are easy to work with, for the even balance properly distributes the weight.

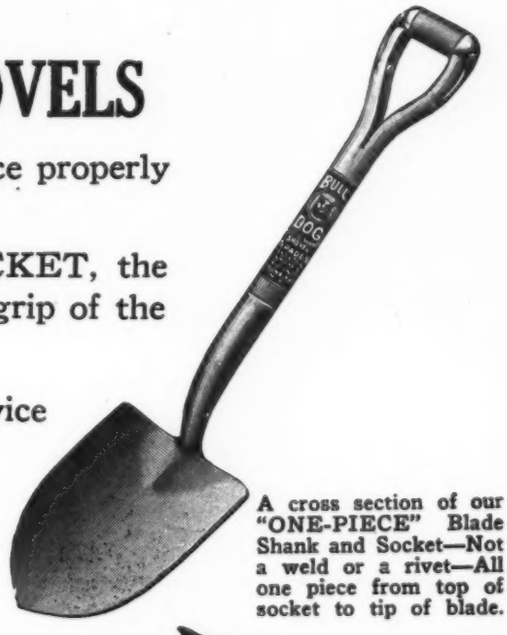
ONE HAND EASILY GRIPS the SOCKET, the other hand comfortably holds the shaped grip of the handle.

A HEAT TREATED Blade gives long service under all conditions.

Write for Catalog

SKELTON SHOVEL CO., Inc.

DUNKIRK, N. Y.



A cross section of our "ONE-PIECE" Blade Shank and Socket—Not a weld or a rivet—All one piece from top of socket to tip of blade.

New York: 29 Murray St.

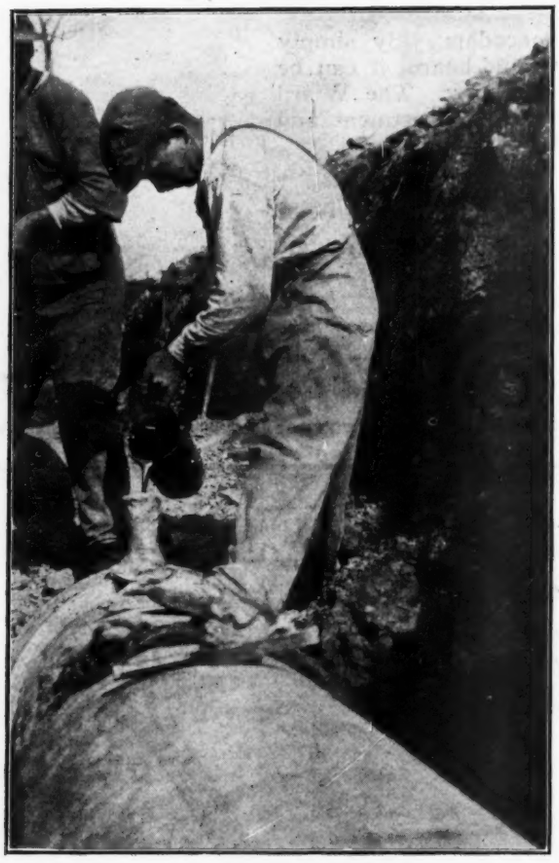
St. Louis: Fed. Res. Bank Bldg.

ALSO MAKERS OF "FOX" SHOVELS

TRADE "LEADITE" MARK
Registered U. S. Patent Office

Caulking Means EXPENSE---

No Caulking Means PROFIT



Making LEADITE Joints on 24 inch c. i. B & S Force Main

It is needless waste of time, money and labor to caulk cast iron bell and spigot water mains.

Why not turn this expenditure into a profit?

Use Leadite which is melted and poured into the joint.

Leadite forms a water-tight bond by filling every crevice of the joint from the yarn out to face of bell of pipe, without caulking.

Leadite means simplicity, efficiency and economy.

Water works all over the world use Leadite because it makes a good joint which improves with age.

Leadite resists electrolysis.

Leadite facilitates rapid progress of the work generally.

Leadite does not corrode or rust.

Leadite has been successfully tested and used for over 30 years.

Thousands of miles of pipe jointed with Leadite are in service.

The up-to-date water works man specifies and uses LEADITE.

LEADITE saves at least 75%

LEADITE is the pioneer self-caulking material for c. i. pipe

Be Sure It Is LEADITE and Accept No Imitations

THE LEADITE COMPANY, Inc.

1511 Land Title Building, Philadelphia, Pa., U. S. A.

NO CAULKING

INDUSTRIAL LITERATURE

DESCRIBING MATERIALS AND EQUIPMENT FOR CONSTRUCTING, OPERATING AND MAINTAINING PUBLIC IMPROVEMENTS.

You can obtain the catalogs listed on this and the following pages by using the form at the bottom of this page or by writing to the company direct, giving the catalog number and mentioning PUBLIC WORKS.

CONTRACTORS' EQUIPMENT

Air Compressors

1. Air Compressors, portable Motor Driven, Stationary, Portable Belt Driven, Portable Tractor Combination are fully described and illustrated in a 32-page and cover catalog issued by Schramm, Inc., West Chester, Pa.

2. Sullivan Machinery Co., Chicago, has a new catalog describing portable air compressors, including WK-312, two cylinder gas engine driven; WK-314, four cylinder gas engine driven; WK-34, Fordson belt driven; WK-32, electric motor driven—Bulletin 77-N, 16 pages, 6x9.

4. Portable Air Compressors for every compressor job and for various mountings are illustrated and described with specifications in a folder by The Buhl Company, 407 South Dearborn St., Chicago.

5. Domestic Engine & Pump Co., Shippensburg, Pa. Portable and compressors for all construction and building needs, illustrated. Mounting and detailed specification of types given. 12 pages, 8x9½.

6. Ingersoll-Rand Portable Compressors are built in the sizes as gasoline engine or electric motor driven units. There are various styles of mountings or furnished without running gear. Ingersoll-Rand Co., 11 Broadway, New York. Bulletin 3415.

Asphalt Plants

11. J. D. Farasey Mfg. Company, Cleveland, Ohio, issue folders of specifications for Farasey Portable Asphalt Paving Plants. These R. R. 1-car plants have easy capacity of 2,250 yards, 2" surface per 8 hours.

Asphalt Surface Heater and Patcher

12. These kerosene burning heaters manufactured by the Hauck Manufacturing Company, 147 Tenth Street, Brooklyn, New York, are illustrated in Bulletin No. 131. Performance and cost data on repairing asphalt pavements by the City of Baltimore, Md., is also available.

Asphalt Tool Heaters—burning kerosene

13. Are described in Bulletin No. 133, issued by the Hauck Manufacturing Company, 147 Tenth Street, Brooklyn, New York.

Concrete Accelerators

13-A. "How to Cure Concrete," a forty-seven-page manual published by the Dow Chemical Company, Midland, Michigan, treats fully the subject suggested by its title. A well-illustrated and instructive volume.

Concrete Mixers

14. Koehring Company, Milwaukee, Wis., have a new illustrated and descriptive folder on their concrete mixers of all capacities and duties. A booklet well worth examining.

15. The American Cement Machine Company, of Keokuk, Ia., describes tilting mixers manufactured by it of various capacities up to size 7 and mounted on two or four wheels. 8 pages. 8½x11.

17. Concrete Mixers manufactured by the Jaeger Machine Company, Columbus, O., described in booklet. 32 pages, 6x9.

18. Koehring Company, Milwaukee, Wisconsin. Catalog describing paving and construction mixers manufactured from sizes of 7E to 21E.

19. Koehring Company, Milwaukee, Wis. Pocket size booklet illustrating complete line, including various paving and construction mixers, trailers, subgrade planers, gasoline cranes, draglines, shovels, bar benders and cutters. 20 pages, 6½x3½.

20. A broadside graphically describing four new concrete tilting-mixers with capacities ranging from 25 to 120 cu. yds. per day, will be mailed on request by T. L. Smith Co., Milwaukee, Wis.

21. Koehring Company, Milwaukee, Wisconsin. Have new specifications catalog on concrete paver No. 7E and construction mixer No. 21S, also a descriptive folder on paver No. 13E.

Concrete Heaters

23. In bulletin 42, Aeroil Burner Co., Hudson Ave., Union City, N. J., describes heaters for concrete in drum during winter, also thawing torches for melting ice on construction jobs and portable water heaters.

24. Concrete heaters burning kerosene, approved by Public Service and State Highway Commissions and Municipal Inspection Bureaus for concreting in zero weather, are in Bulletin No. 1002, issued by the Hauck Manufacturing Company, 147 Tenth Street, Brooklyn, New York.

Chutes and Towers, Concrete

25. The Insley Manufacturing Company, of Indianapolis, describes concrete chutes in connection with steel towers and Mast Hoist Plants in Catalogs 44 and 45. 95 pages and 16 pages, 8x11.

26. The Insley Manufacturing Company of Indianapolis describes steel towers and steel masts in connection with chutes for placing concrete, in Catalogs 44 and 45. 95 pages and 16 pages, 8x11.

Dredges

30. The Bay City Dredge Works, Bay City, Mich., issue Catalog D, describing Bay City Land Dredges for canal and open ditch excavation or cleanout and ditch maintenance work. Oil engine operated. 72 pages, 6½x10.

Drills

35. Sullivan Machinery Company, Chicago, builds its Rotator Type hand-held hammer drills in seven models for many rock drilling purposes. One is a steam engine. Bulletin 81-B, 32 pages, 6x9.

Drills, Tunneling, Water, Jet

36. Sullivan Machinery Company, Chicago, has a new catalog, No. 81-F, describing its DW-64 water jet tunnelling drill. 135 lb. weight. May be used on tripod or bar for down holes to 32 ft., or as 90 lb. hand drill with suitable handles. 16 pages, 6x9.

Dump Bodies, Steel

45. Ford Truck Steel Dump Bodies and hydraulic hoists are manufactured by the Wood Hydraulic Hoist & Body Company, 4196 Bellevue Ave., Detroit, Mich.

48. Mandt 100% trouble-proof automatic dump bodies for garbage, charging pavers and all contractors' uses. Catalog 9x11. The Mandt Company, Keokuk, Iowa.

49. "Hoists, Dump Truck." Double the Truck's Value by using power operated Hydraulic Hoists. Catalog of WOOD Hydraulic Hoist and Body Company, Detroit, Michigan, describes Hydraulic Hoists for every make and model of Truck.

50. "Dump, Bodies, Steel." WOOD Hydraulic Hoist & Body Co., Detroit, Mich., manufacturers all Steel Dump Bodies for every hauling proposition and Self-Dumper Bodies for road builders Trucks. Special Bulletins.

Engines

52. Climax Engineering Co., Clinton, Iowa, 4 and 6 cylinder engines for Road Building, Hoists, Tractors, Air Compressors, Excavators, etc., described in Bulletins A, B, C, D and H.

Loaders and Unloaders

55. The Universal Road Machinery Company, Kingston, N. Y., issues two bulletins describing the Reliance Portable Car Unloader and Reliance Chip and Sand Spreader.

57. Link-Belt Company, Philadelphia, the originators of Portable Loaders, have issued a folder giving recently reduced prices on the famous "CUB" Loader (belt type), and the Type "C" bucket loader, with condensed information on other popular types.

58. An interesting book describing Link-Belt Rivetless Chain, replete with illustrations, supported by tables of weights and strengths, the advantageous uses on conveyors, elevators, etc. Address the Link-Belt Co., Chicago, Philadelphia or Indianapolis.

59. Car Loaders. The Heltzel Bulletin No. 8 describes car unloaders and other contractors' equipment.

Motor Trucks and Tractors

60. An illustrated pamphlet picturing American-LaFrance commercial trucks in actual service with contractors, builders and allied lines, issued by American-LaFrance Fire Engine Co., Elmira, N. Y.

61. A catalog illustrating and describing American-LaFrance commercial trucks as completely manufactured by the American-La France Fire Engine Company in their modern plant at Bloomfield, N. J.

62. The Ford Motor Company issues a monthly magazine, The Fordson, dealing with agricultural uses of the Fordson Tractor. 16 pages, 8¼x11¼.

63. The Ford Motor Company issues a monthly magazine, Power & Haulage, dealing with industrial and commercial uses of the Fordson Tractor and Ford Truck. 16 pages, 7½x10¾.

64. The General Motors Truck Company, Pontiac, Mich., issues a booklet illustrating the service of GMC trucks in road construction and maintenance. "Money Saving Transportation." 16 pages, 8x11.

65. Specifications by parts of GMC trucks, motor and chassis are given in a booklet, "General Motors Trucks," issued by the General Motors Company, Pontiac, Mich. 48 pages, 8x11.

66. The Huber Mfg. Co., Marion, Ohio, issues bulletins, "Huber Tractors" and "The Huber Scarifier." Illustrations of machines in operation and testimonials from users.

67. The J. T. Tractor Company, Cleveland, Ohio, sends descriptive bulletin illustrating the design, equipment and application of J. T. Tractors.

69. "Kerosene Power, the Low-Price Road Builder," bulletin by the International Harvester Co., Chicago, shows economy of kerosene tractors. Illustrations, specifications, and figures on cost of operation.

70. "There Is a Definite Reason for Every Road Building Success," issued by International Motor Company, 25 Broadway, New York, tells how three big operations were handled and reasons for success.

71. "Earth Moving and Hauling of Building and Road Materials," 32-page illustrated booklet showing part of motor trucks in highway building and bulk hauling. International Motor Company, 25 Broadway, New York.

72. Highland Open-for-Summer or Completely-Closed-for-Winter Cab Bodies are built for all conditions of speed wagon or truck service. Bulletins. Highland Body Mfg. Company, Elmwood Place, Cincinnati.

(Continued on page 70)

USE THIS FORM FOR ORDERING CATALOGS

PUBLIC WORKS,
243 West 39th Street, New York City.

Gentlemen:

Please send me the following catalogs listed under Industrial Literature Section

.....
(INDICATE BY NUMBERS)

NAME ..... STREET ADDRESS ..... CITY .....

Crawlers for Tractors

74. A 12-page, 8½x11 illustrated booklet has just been issued by the Full-Crawler Company, 500 Clinton St., Milwaukee, Wis., describing and showing actual photographs of the Trackson performing various types of contracting work. The machine and special accessories are described and illustrated. Specification gladly sent on request.

Pumps, Contractors'

75. The Edson Manufacturing Corporation, Boston, describes its improved designs in diaphragm pumps, both hand and power; odorless force pumps, and suction hose for the same and other pump accessories. 9 pages, 8½x11.

76. Domestic Engine & Pump Company, Shippensburg, Pa. Centrifugal, diaphragm and trench force pumps described and illustrated. Specifications by parts of electric-driven pumps and gas power units. 8 pages, 8x9½.

79. Bulletin No. 56, illustrating the Barton Portable Pump and its attachment to automobile motors, describing the simplicity of operation and its many practical uses, issued by the American Steam Pump Co., Battle Creek, Mich.

80. The construction, uses and proved performance of the Nye New Model High Pressure Pump, fully illustrated and described in Catalogue No. 20. Nye Steam Pump & Machinery Co., 701 N. Western Ave., Chicago, Illinois.

81. In a 160-page catalog Aldrich Pump Co., Allentown, Pa., describes and illustrates Road, Deep Well and other pumps for every service. When interested in pumps write for this catalog.

82. Humdinger Diaphragm force pumps open discharge diaphragm pumps, triplex road pumps and portable centrifugal pumps described and illustrated in bulletin No. 102. Ralph B. Carter Co., 152 Chambers Street, New York City.

Road Finishing Machines

85. The Heltzel Steel Form & Iron Co., Warren, Ohio, publish a treatise of finishers, strikeoffs and graders, including descriptions of hand finishers, automatic strikeoff and grader.

Road Rollers, Scrapers, Graders, etc.

86. Adams Leaning Wheel Graders, Fordson Graders, Road Patrols and other road and street maintenance equipment are illustrated and described in a new 60-page catalogue issued by J. D. Adams & Co., 217 S. Belmont Avenue, Indianapolis, Ind.

87. A broadside issued by the Maimi Trailer-Scraper Co., Troy, Ohio, contains complete specifications, illustrations and convincing testimonials of the advantages and economy of Maimi earth-moving scrapers. Gladly sent on request.

88. Everything for the Road Maker. Good Roads Machinery Co., Kennett Square, Pa., issue a 48-page catalogue describing complete line of Road Graders, Rock Crushers, Road Drags, Road Rollers, Oiling Machinery and Culvert Pipe.

88-A. The Miami Trailer-Scraper Co., Troy, Ohio, has compiled some accurate dirt moving costs which will be mailed to any one interested.

89. Monarch Cub Road Roller. A bulletin is issued by The Good Roads Machinery Company, Kennett Square, Pa., describing The Monarch Cub Roller with Scarifier and Planer attachments.

90. The Buffalo Springfield Roller Company, Springfield, Ohio. Pocket size booklet with return card, showing all types of Buffalo Springfield steam and motor rollers and scarafiers. 20 pages, 6¼x3½.

95. Road Machinery of all kinds is manufactured by the Austin-Western Road Machinery Company, Chicago. Special features of graders, scarifiers, crushers, elevators, sprinklers, culverts, etc. Catalog 24, 64 pages, 9x12.

98. The Russell Grader Manufacturing Company of Minneapolis issues an illustrated catalog of its road machines, planers, finishers, drags, scrapers, etc. Printed in two colors and handsomely gotten up. 68 pages. 8½x11.

99. Acme Road Machinery Co., Frankfort, N. Y., issues descriptive bulletins of gas and steam rollers, rock crushers, graders and other road building machinery.

100. The Austin-Western Road Machinery Company, of Chicago, issues a catalog entitled, "The Austin-Western Line," describing graders, scrapers, screens, rollers, scarifiers, etc. 64 pages, 9x12.

101. Self-loading Scrapers, Baker Maney, 1¼- and ¾-yard models described and photographs of trains two to six behind tractors. Catalog 209, Baker Mfg. Company, 525 Stanford Avenue, Springfield, Illinois.

102. Quick ditching, filling and grading at big savings of money and time by Byers Bear Cat all-purpose light cranes. Described in new catalog by Byers Machine Co., Ravenna, O.

103. Rock Crushers, Elevators, Conveyors, Screens and Bins. The Good Roads Machinery Co., Kennett Square, Pa., issue a 36-page illustrated book describing Champion Rock Crushers, attachments for same and portable and stationary rock crushing plants.

104. A large line of stationary or portable stone crushers and screens for light and heavy duty are described in illustrated folder 124-M by the Universal Crusher Co., Cedar Rapids, Iowa.

105. The Galion Iron Works and Mfg. Co., Galion, Ohio, issues a large illustrated catalogue describing their steam and motor road rollers and graders, giving detailed specifications including accessories and attachments.

106. The Sweet's Steel Company, Williamsport, Pa., are now distributing a complete Catalog on Light Steel Rails, complete with all necessary accessories for Permanent or Portable Track.

Sand and Gravel Washing Plants

108. Link-Belt Co., Chicago, issues a seventy-page catalog giving complete information regarding Sand and Gravel Washing Plants, stationary and portable. Those interested in such equipment should have a copy.

Wheelbarrows

107. Carts for handling green concrete are described fully in a catalog issued by Sterling Wheelbarrow Co., Milwaukee, Wisconsin.

109. A 16-page illustrated catalog describing and illustrating in detail every part that goes into a good wheelbarrow is issued by Sterling Wheelbarrow Co., Milwaukee, Wisconsin.

Steam Shovels, Cranes, Excavators

110. The Bay City Dredge Works, Bay City, Mich., issue Catalog F, describing one-man operated, convertable gasoline or electric caterpillar mounted shovels for trench excavation and general material handling work. 52 pages, 6x9.

111. The Erie Steam Shovel Co., Erie, Pa., will mail detailed specifications and illustrations of dragline excavators and steam shovels. 8½x11.

112. Type V Full Revolving Truck Crane is described and illustrated in a new 32 page folder. The Crane swings completely around lifting heavier loads at longer distances. Orton & Steinbrenner Company, Chicago.

113. Erie Caterpillar Mountings for Steam Shovels and Cranes with illustrations of distinctive Erie features, are described in Bulletin S-60, issued by the Erie Steam Shovel Company, Erie, Pa. 20 pages, 8½x11.

114. Harnischfeger Corporation, successor to Pawling & Harnischfeger, Milwaukee, describes fully the construction and operation of gasoline or electric powered shovels, draglines, skimmer scoops and cranes. 34 pages, 8½x11.

115. Harnischfeger Corporation, successor to Pawling & Harnischfeger, Milwaukee, Wis., describes fully the construction and operation of ¾ and 1 cu. yd. gasoline or electric shovels. 34 pages, 8½x11.

116. The Insley Mfg. Co., Indianapolis, Ind., issues special booklets on portable gas unit excavators, concrete construction and contractors' equipment.

117. Koehring Company, Milwaukee, Wisconsin. Bulletins and large, descriptive folder on two sizes of ¾ and 1 cubic yard bucket capacity of gasoline cranes and draglines, and sizes of ¾ and 1¼ cubic yard capacities of shovels.

118. Sewer and trench excavating units, clamshell and dragline shovels, involving deck and railroad type excavators, are illustrated in a series of bulletins by the Osgood Company, Marion, Ohio.

120. The Orton & Steinbrenner Co., Chicago, issue catalog No. 20, describing construction, equipment and operation of 7 and 12-ton crawling tread and road wheel locomotive cranes.

121. "Mr. Barber's Scrapbook," a booklet issued by the Barber-Greene Company, Aurora, Illinois, contains interesting data on efficiency of Barber Greene trenchers and conveyors at various jobs.

122. "Contracting With Barber-Greenes," a 24-page booklet showing B. G. conveyors and ditchers loading wheelbarrows and cars, hauling material, pouring wet concrete, excavating, etc. Barber-Greene Company, Aurora, Ill.

123. "Cutting Mains and Services With a Barber-Greene Trencher," booklet by the Barber-Greene Company, Aurora, Ill., illustrates B. G. trenchers cutting services, straddling mains, passing obstructions, backfilling, etc.

124. Crawler and Locomotive Cranes, with Grab Bucket, Hook Block, Pile Driver, Scraper Bucket, Steam Shovel Dipper, etc., are described in catalogs of 28 and 40 pages, issued by Link-Belt Co., Chicago.

Steel Forms

125. The Heltzel Steel Form & Iron Company, Warren, Ohio, issue a series of booklets describing Heltzel Curb and Gutter Forms, Steel Road Forms and Sidewalk Forms.

126. Road Forms. The Heltzel Bulletin No. 8 describes steel road forms and other contractors' equipment.

127. Curb and Gutter Forms. The Heltzel Bulletin No. 8 describes curb-and-gutter forms, straight curb and integral curb and base forms.

128. Sidewalk Forms. The Heltzel Bulletin No. 8 describes steel sidewalk forms and other contractors' equipment.

Tools, Pipe

130. Joseph G. Pollard Co., Inc., of 146 Raymond Street, Brooklyn, New York, issues catalogue illustrating Sulky derricks, lead melting furnaces, and all kinds of tools and equipment used in laying pipe.

BRIDGES, CONCRETE

134. Concrete Highway Bridges, a 24-page booklet, with 23 handsome half tone pictures of bridges and 5 pages of standard bridge and culvert plans, issued by Portland Cement Association, Chicago.

FIRE FIGHTING EQUIPMENT

138. Fire Fighting Apparatus of all kinds. Pumps and Equipment mounted on commercial chassis. Complete information on request. Waterous Fire Engine Works, St. Paul, Minn.

140. A catalog containing illustrations and specifications of all types of modern motor fire apparatus as manufactured by the American-LaFrance Fire Engine Company, Elmira, N. Y.

141. The General Motors Truck Company, Pontiac, Mich., issues a booklet illustrating and describing newest features of GMC fire trucks and trailers. 25 pages, 8x11.

Modern Pumps for Motor Fire Apparatus

142. An illustrated booklet by the American LaFrance Fire Engine Company, Elmira, N. Y., which describes the relative merits of rotary, piston and centrifugal pumps for motor driven fire apparatus.

LIGHTING SYSTEMS

Ornamental Lighting Standards

144. The Alabama Pipe Company, 342 Madison Ave., New York City, carry a line of Cast Iron ornamental lighting standards and are prepared to make up special design posts according to specifications. Literature on request.

Ornamental Street Lighting

145. Catalogue 8-B issued by the Westinghouse Electric and Manufacturing Company describes the complete line of ornamental street lighting equipment made by that company. Address the nearest district office.

Overhead Street Lighting

146. "City Zoning of Street Lighting" by Chas J. Stahl, is an article showing the advantages of properly planned street lighting. Write for Reprint 162 to the nearest district office of the Westinghouse Electric and Manufacturing Co.

Highway Lighting

148. Folder 4809. A four-page folder describing the Westinghouse Highway Lighting Unit which is specially designed to effectively illuminate interurban highways. Address the nearest district office. Westinghouse Electric and Manufacturing Co.

PAVING MATERIALS

Asphalt

151. "From Maine to Miami," booklet by the Standard Oil Company of New York, illustrates well-known highways paved with Standard Asphalt Compounds, Standard Oil Company of New York, 26 Broadway.

Warrentite Bitulithic

153. All about Warrentite Bitulithic pavement for all road conditions described in 15 booklets of words and pictures. Scenic views and technical descriptions of famous highways. Warren Bros. Company, Boston, Mass.

Brick

155. "The A-B-C of Good Paving." Features of engineering involved and principles of brick paving. Published by the National Brick Paving Manufacturers' Association. 16 pages, 6x9.

(Continued on page 72)

USE THE COUPON AT BOTTOM OF THE FIRST PAGE IN THIS SECTION

The Original Jaeger Tilting Drum Mixer

ONLY in the original Jaeger Tilting-Drum will you find the split paddles and flat spots that mean perfectly mixed concrete.

Jaeger

Entire Satisfaction!

THAT phrase completely expresses the feeling of Jaeger owners! For Jaeger Mixers create pride of possession—assurance of low cost operation—and time and labor savings that spell profits! The contractor who buys a Jaeger has purchased a mixer with a reputation for service! And scores of unsolicited letters from successful builders tell us, "I'm proud of my Jaeger's record!"

Built-in Quality

The sturdy Jaeger Mixers have quality and value "in-built." Every piece of material used in their manufacture is carefully selected and tested. Every bolt and nut and screw—and every sheet of steel—is chosen for proven reliability under stress and strain. And no mixer leaves the Jaeger plant without thorough inspection and a grueling "try-out."

Jaeger Mixers have exclusive, patented advantages. The Jaeger Tilting-Drum Power Loader—Accurate Measure Water Tank—and Gravity Discharge Device are to be found only in a Jaeger Mixer. High quality—low price—and nominal operation and upkeep cost make Jaeger Mixers equipment any contractor can well be proud to own.

Write us today for catalog—prices—and the name of our nearest dealer.

The Jaeger Machine Company

400 Dublin Avenue **Columbus, Ohio**

156. Recommended Specifications for laying brick pavements are contained in a handy booklet by the National Paving Brick Manufacturers' Association, Cleveland, Ohio. 92 pages, 6x9.

Concrete Curing Compound

175. The Dow Chemical Company, Midland, Mich. "How to Cure Concrete" is a "manual of instruction on the curing of concrete pavements." A handy, useful volume, well illustrated. 47 pages, 5½x7½.

176. The Dow Chemical Company, Midland, Mich. "How to Maintain Roads" is a manual of information on road building and maintenance. Contains tables of composition, grading, etc.

Cement

179. American Vibrolithic Corporation, Des Moines, Iowa, issue a 16-page pamphlet describing Vibrolithic method of constructing bases for bituminous pavements which prevent creeping, removes excess water, and creates a mechanical bond.

181. "What Is Vibrolithic?" A new folder describing this method of paving and clearly explaining its salient points has just been issued by the American Vibrolithic Corporation, Insurance Exchange Bldg., Des Moines, Iowa.

Expansion Joints

195. The Philip Carey Company, Cincinnati, Ohio, presents a catalog of Carey Elastic expansion joint with physical and chemical description, numerous illustrated examples of use for streets, sidewalks and elsewhere. 70 pages, 8½x10½.

196. The Hoosier Asphalt Company, Alexandria, Indiana. Bulletin on Expansion Joints and Asphalt Compositions.

197. The Hoosier Asphalt Company, Alexandria, Indiana, prepares an illustrated folder on "Perfect Expansion Joints" for concrete roads, gutters, curbs, floors, dams, etc, stating laboratory test results and sizes.

Rail Filler

201. The Philip Carey Company, Cincinnati, issues literature describing Elastite Rail Filler, a preformed asphaltic cushion fitting all rails, which absorbs rail movement, excludes water and frost and materially reduces track noise.

Tarvia

205. "Tarvia-K. P. for Cold Patching." An instructive booklet illustrating and describing each step in patching a road with "Tarvia K-P." 16 pages, illustrated, 3½x9. The Barrett Company, New York.

205A. "Road Maintenance with Tarvia." Shows how almost every type of road and pavement can be repaired and maintained with Tarvia. 56 pages, illustrated, 6x9. The Barrett Company, New York.

205B. "Tarvia." An attractively illustrated booklet describing grades of Tarvia and showing photographs of actual applications. 32 pages, 9x6. The Barrett Company, 40 Rector Street, New York City.

205C. "Tarvia Double Seal Pavements." Shows, step by step, the construction of a Tarvia pavement. Profusely illustrated with photographs. 24 pages, 6x9. The Barrett Company, 40 Rector Street, New York.

Preservatives

206. Preservation of Streets and Roads by the Use of Road Oil, with many illustrations and testimonials from users. The Standard Oil Co., of Indiana, Chicago.

207. Stanolind Paving Asphalt, a compound prepared by the Standard Oil Co. of Ind., is described in minute detail in booklet "Stanolind." Standard Oil Co. of Indiana, Chicago.

ROAD AND STREET MAINTENANCE EQUIPMENT

Dust Control

215. "How to Maintain Roads," by the Dow Chemical Company, Midland, Michigan, is a manual dealing thoroughly with dust control, road building and maintenance. It contains tables of composition, grading, etc.

Heaters, Asphalt and Tar

216. An illustrated catalogue describing portable and stationary asphalt heaters, tar and gravel heaters, pipe line supplies and contractors' equipment, issued by the Union Iron Works, Hoboken, N. J.

219. Aeroil Burner Co., Hudson Ave., Union City, N. J. Bulletin 44 describes oil burning "Smokeless" asphalt and tar kettles, surface heaters, paving tool heaters, maintenance patrol heaters for street, road and highway work.

220. The Mohawk Asphalt Heater Company, Scotia, N. Y., presents a New Bulletin describing the Original Improved "Hotstuf" Asphalt Heater, an economical oil burning heater, for general construction and maintenance. 4 pages, 6½x10.

221. Connery & Company, Inc., of Philadelphia, has issued a new catalog describing improving types of Tar and Asphalt Heating Kettles for the road contractor. 30 pages, 6½x8½.

222. Connery & Company, Inc., of Philadelphia, has issued Bulletin No. P-1 describing Oil Burning Patrol Patching Heater for Paving Contractors, Street and Highway Departments.

224. A new catalogue of tar and asphalt heaters, sand and gravel dryers, paving tools, etc., for road and street work, has just been issued by Littleford Bros., of Cincinnati, Ohio. 32 pages, 6x9.

226. Littleford Bros., of Cincinnati, Ohio, issue a new illustrated book showing the application of the Andresen Road Repair Outfit in maintenance of Roads and Streets. 32 pages, 8¼x11.

D228. The Ord Concrete Road Finisher. Compact, self-powered, capacity 100 ft. of road per hour, is described in well illustrated booklet. A. W. French & Co., 208 N. Clinton St., Chicago.

230. The Chausse Oil Burner Co. present a new descriptive circular of the 2 quart hand torch and the 3 gallon hand torch. Other portable heaters and torches are included.

231. A bulletin describing the latest improved type of kerosene burning kettle heaters, which can be easily cleaned and kept in satisfactory operation for years, issued by the Hauck Manufacturing Company, 147 Tenth Street, Brooklyn, New York.

Mowers

237. The Rawls Machine & Mfg. Works, Chicago, Ill., issue a 40-page catalogue describing Rawls Mowers for highways and railroads. Catalogue contains complete data; illustrations, specifications, repair parts and prices. Write for your copy.

Road and Street Maintenance Equipment

238. "How to Maintain Roads," by the Dow Chemical Company, Midland, Michigan, is a manual dealing thoroughly with road building, maintenance and dust control. It contains tables of composition, grading, etc.

Snow Removers

239. "Snow Insurance," a booklet by the Barber Greene Company, Aurora, Illinois, tells and shows by illustrations how many cities clear their streets with Barber Greene Snow Loaders.

240. The Hadfield-Penfield Steel Co., Bucyrus, Ohio, has just issued new circulars describing Fordson Snow Removers and Hadfield-Penfield One-Man Graders.

241. Baker Snow Plows for Motor Trucks and Tractors, "V" and Straight Blade in various models and sizes. Catalog 216, 48 pges. Baker Mfg. Co., 525 Stanford Avenue, Springfield, Ill.

243. Caterpillar tractor snow removers at work are illustrated in a booklet issued by the Holt Manufacturing Company, Inc., Peoria, Ill., and Stockton, Calif. Specifications and testimonials. 10 pages, 8½x11.

Graders

250. "Modern Road Building with Adams Adjustable Leaning Wheel Graders," 60-page, 8½x11- in. catalogue issued by J. D. Adams & Co., Indianapolis, shows graders, 6½ to 12 ft. blade sizes, and other earth moving equipment for contractors.

SEWAGE DISPOSAL APPARATUS

274. The Dorr Company, 247 Park Ave., New York City, in Bulletin 20, describes the use of its appliances for treating municipal sewage and industrial wastes and water. 8 pages, 8x11.

275. Link-Belt Company, Philadelphia, issues a book describing the Tark Sewage Screen for separation of solids from incoming sewage—a construction furnishing maximum fine screening capacity, in a minimum space, at minimum cost.

277. The Pacific Flush Tank Company, of Chicago and New York, publish eight separate catalogs on Sewer and Sewage Disposal Automatic Equipment, including pumps, Imhoff Tanks and Sewer Joint Compounds.

278. The Sanitation Corporation, 165 Broadway, New York, Sanitation screens and gates described in a series of illustrated bulletins, 126-2, 126-3, L-19, B-9.

279. The Direct Oxidation Process Corporation of Philadelphia, in a treatise describes the principles of its electrochemical process for treating waters, sewage and industrial wastes.

280. Yoemans Brothers Company, 1433 Dayton St., Chicago, issues bulletins describing Shone Pneumatic Sewage Ejectors and Yoemans Centrifugal Sewage Pumps for Municipalities. Leaflet E-2200 describes Duplex Centrifugal Sewage Ejectors.

282. Advantages of Liquid Chlorine for disinfection given in booklet issued by the Electro Bleaching Gas Co., 9 East 41st St., New York.

283. General Filtration Company, Rochester, N. Y., issues two booklets: (a) General data on the Activated Sludge Process. (b) Booklets descriptive of Filtros, the diffusing medium in practically every activated sludge plant.

283-A. Full information on the Venturi Meter which has been used for sewage measurements for many years. Bulletin No. 210. Builders Iron Foundry, Providence, R. I.

283-B. San-Equipment Septic Tanks for homes, institutions, etc., not connected with sewers, are described and illustrated in a folder issued by Chemical Toilet Corporation, 801 Tree St., Syracuse, N. Y.

Sewage Pumps

284. Wood and Trash Sewage Pumps to suit varying needs are described in illustrated catalog 28-A, issued by the Pacific Flush Tank Co., Singer Building, New York.

Concrete Pipe

285A. Reinforced Concrete Pipe for sewers, culverts and water conduits and advantages in using it are described in booklet by the Independent Concrete Pipe Co., 201 N. West St., Indianapolis, Ind.

Vitrified Clay Pipe

286. Traps, Elbows, T branches, slants and sockets and all standard clay pipe fittings. Catalog F, The Evans Pipe Company, Uhrichsville, Ohio, gives illustrations and prices.

287. Roming Clay elbows, channel pipe, T sections, reducers, etc. Illustrated in folder by the Romig Clay Product Company, Uhrichsville, Ohio.

288. Portland Vitrified Clay piping made especially for Chlorine lutes and acid systems, also sectional conduits, vitrified cable ducts and sewer pipe. Booklet by Portland Stoneware Company, 49 Federal Street, Boston.

290. Clay sewer pipe, elbows, branches, slants, curves and channel pipe, etc., at discount rates. Price and specification folder sent. Buckeye Fire Clay Company, Uhrichsville, Ohio.

291. East Ohio Sewer Pipe Co., Irondale, Ohio, issues a folder giving prices, sizes, etc., of Vitrified Sewer Pipe, wall coping, fire brick and other products of clay.

291A. The Cambria Clay Products Co., Blackford, Ohio, Mfrs. of Vitrified Sewer pipe, Fire Brick, Hollow Building Tile, Wall Coping and other clay products, issues a folder giving prices, etc.

291B. Patton Clay Mfg. Co., Patton, Pa., have a pamphlet containing such useful information regarding sewer pipe as, carrying capacity, directions for laying sewer pipe, weights of materials, etc.

291C. The Crouse Clay Product Company, Akron, Ohio. Manufacturers of Akron Shale Sewer Pipe. Description given in a folder.

291D. A new pamphlet containing interesting testimony on the value of vitrified glazed sewer pipe as a resistant of all acids and elemental conditions is offered by the Clay Products Association, Chicago, Ill.

Pumps

292. Pumps, well strainers, tube well supplies, pumping engines, pipe and water works accessories. A. D. Cook Company, Lawrenceburg, Ind. Catalog. 65 pages, 7x10.

293. The Kinney Mfg. Company, Boston, sends a folder of bulletins on Rotating Plunger Pumps, Unloading Pumps, also tables of information for water works calculations.

Pumps, Sewage

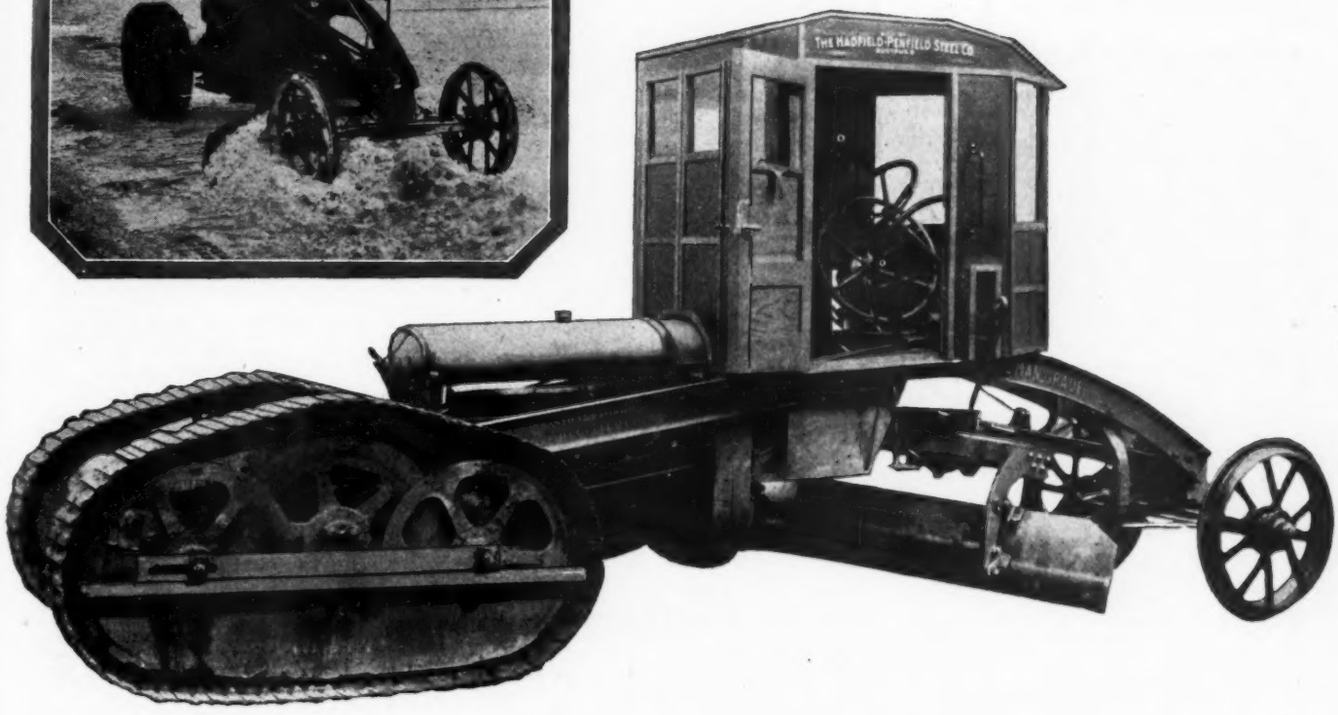
294. Aurora Pump & Mfg. Co., of Aurora, Ill., describe, in their Bulletins Nos. 101 and 200, their line of open end enclosed impeller, vertical and horizontal, high efficiency centrifugal sewage pumps.

Pipe Seal

296. The Ruberoid Co., 95 Madison Ave., New York City, will send for your information a bulletin outlining the characteristics

(Continued on page 74)

USE THE COUPON AT BOTTOM OF THE FIRST PAGE IN THIS SECTION



Even in the Winter

Even in the winter country the investment in the Hadfield-Penfield "One Man" Grader doesn't stop earning a dividend. And what is true of bleak districts is also true where there is storm and rain.

No need to stop the work on account of the weather because the H. P. Cab, installed on the "One Man" Grader, makes it an all the year round proposition, rain or shine.

On road construction, maintenance or patrol and on contract work of other kinds the H. P. "One Man" Grader moves material quickly and cheaply. It Roots, Scarifies, Rolls, Ditches, Back-fills, Grades and does much other work.

It is attached or detached quickly. The tractor can be used for other work when not equipped with the Grader.

Cost of work cut three ways; in operating cost, in more accomplished and in crew required. One Man is the whole gang.

Get new Broadside Circular just out. It's yours on request.

Hadfield-Penfield Steel Co.

Bucyrus, Ohio

RIGID RAIL TRACKS

HADFIELD PENFIELD

ONE MAN GRADER

of Ruberoid pipe-seal and its definite advantages for making watertight joints in tile sewers.

STREET CASTINGS

300. Cast iron sewer blocks, ventilators, manhole covers and inlets, valves, etc., described in pamphlet by the South Bend Foundry Co., South Bend, Ind.

301. The Burch Sewer Inlets, manufactured by the Burch Plow Works Co., Crestline, Ohio, are illustrated in detail with complete specifications accompanying. Booklet. 30 pages, 6x9.

TRENCHING MACHINES

310. Harnischfeger Corp., successor to Pawling & Harnischfeger, Milwaukee, describes fully the construction and operation of wheel and ladder type gasoline powered trenchers for cutting trenches of various widths up to 18 ft. in depth. 34 pages, 8½x11.

STREET CLEANING AND REFUSE DISPOSAL

Street Cleaning and Refuse Disposal

318. Cleaning up city dumps is described and illustrated in a booklet of the Full-Crawler Company, 500 Clinton St., Milwaukee, Wis. Sent free on request.

Flushers

320. A special folder describing GMC Flusher units is issued by the General Motors Company, Pontiac, Mich. Specifications of each model with illustrations.

Vacuum Sweepers

323. The Butler Vacuum Street Sweeper as used by New York and other large cities is described in an illustrated folder issued by the Butler Manufacturing Company, 1810-16 East 24th Street, Cleveland, Ohio.

Sweepers

324. Catalogue No. 4 issued by the Kinney Mfg. Co., Boston, Mass., gives complete information on the sturdy construction and simplicity of operation of the Kinney-Springfield Motor Sweeper, supplemented by numerous illustrations.

Garbage Disposal Plants

INCINERATION FOR MUNICIPALITIES

330. The Decarie Incinerator Company of New York City has published a description of its 300-ton incinerator at 56th St. and 12th Ave., New York City. Profusely illustrated. 8 pages, 8x10.

WATER WORKS EQUIPMENT

Cement Lined Pipe

365. Steel or Wrought Iron Pipe lined with cement and special lead-lined joints, manufactured by the Cement Lined Pipe Co., of Lynn, Mass.

Derricks

370. A pipe line equipment catalogue on Water Works tools and equipment, derricks of different styles, lead melting furnaces (oil and coke burning), issued by Joseph G. Pollard Co., Inc., 146 Raymond Street, Brooklyn, New York.

Couplings and Tees

369. The Mueller Co., Decatur, Ill., Copper pipe for water works services and patented connections for jointing to corporation stops, iron pipe, etc. 22 pages, 4½x6.

Locating Leaks

374. How to detect and locate leaks by sound is told in two bulletins by the Empire Electric & Water Company, 452 Lexington Avenue, New York, distributors of the Geophone leak detector.

Hydrants

375. "R. D. Wood & Co., Philadelphia. Handy circular describing and illustrating "Mathews" Fire Hydrants, Gate Valves and other water works appurtenances. 16 pages, 7¾x10¾.

376. Holyoke Fire Hydrants, Gauges, Vases, etc., manufactured by the Norwood Engineering Co., Florence, Mass., are described in bulletins of illustrations and specifications.

377. Gate Valves, Fire Hydrants, Indicator Ports, Floor Stands, etc., together with tables of calculation for mechanical engineers. Catalog 11, leather-bound, 100 pages, 6x9. Darling Valve & Mfg. Company, Williamsport, Penna.

378. Hydrants, tapping apparatus, gate locks, valves and curb cocks described in a series of bulletins issued by the A. P. Smith Mfg. Company, East Orange, N. J.

378A. Diagrams, specifications and testimonials of Waterous compression fire hydrants and Waterous fire engines are given in a booklet by the Waterous Fire Engine Works, St. Paul, Minn.

378-B. "Newtype" Hydrants and Water Gates are described in a bulletin issued by the Kennedy Valve Mfg. Co., Elmira, N. Y. Bulletins contains diagrams and complete specifications.

Meters

379. "Watch Dog" Current Meters for every need manufactured by the Gamon Meter Company, 282 South Street, Newark, N. J. Catalog of illustrations, 19 pages, 7x10.

380. The Buffalo Meter Company, Buffalo, issues a very complete catalog describing Niagara and American disc water meters. These meters are made with either solid type casing or frost bottom casing.

381. The Buffalo Meter Company, Buffalo, issues a special catalog describing Niagara Oil and Gasoline Meters, which explains the method of installing and operating these meters.

383. "Water Meter Simplicity" by the Badger Meter Manufacturing Co., Milwaukee, Wis., is a neat booklet of information about Badger Meters and their construction. 22 pages, 6½x9.

384. The Pittsburgh Meter Company, 7800 Susquehanna St., Pittsburgh, Pa., presents an attractive, convenient catalog illustrating and describing and giving complete specifications of their various types of water meters. 6x9.

385A. "The Venturi Meter for Main Pipe Lines" contains interesting information and illustrations of many installations of the Venturi Meter manufactured by the Builders Iron Foundry, Providence, R. I.

386. Frost-proof disc water meters, made in three sizes and constructed to withstand severe temperatures, described and illustrated in booklet by Thomson Meter Company, 100-110 Bridge Street, Brooklyn, N. Y.

387. Lambert Current and Duplex Meters, made for heavy duty and absolute accuracy, described with prices and specifications in booklet by Thomson Meter Company, 100-110 Bridge Street, Brooklyn, N. Y.

Pipe, Cast Iron

388. Cast Iron Pipe conveyors for caustics, acids, explosives and corrosive chemicals of all kinds. Booklet, "Cast Iron Pipe." Cast Iron Pipe Publicity Bureau, Peoples Gas Bldg., Chicago, Illinois.

389. "Planning a Waterworks System" is a booklet of highly valuable information for supervisors of waterworks in small municipalities. Issued by Cast Iron Pipe Publicity Bureau, Peoples Gas Bldg., Chicago, Illinois.

389-A. A handsome catalogue of 74 pages and profusely illustrated on Water Works Specialties, Gauges of all types, Meters, Meter Boxes, Finders, Adapters, and Housing is issued by the H. W. Clark Co., Mattoon, Ill.

390. The McWane Cast Iron Pipe Co., Birmingham, Ala., issues Catalog P, describing Cast Iron Pipe, sizes 1@ through 8 inches, equipped with factory-made Precalked lead joints in the bells.

391. R. D. Wood & Co., Philadelphia, issues a new booklet giving weights and dimensions of Cast Iron Pipe and Fittings. A handy reference book for Municipalities and Contractors. 48 pages. 7¾x10¾.

392. James B. Clow & Sons, 534 Franklin Street, Chicago. Complete catalog and data book, for water works superintendents and engineers, showing cast iron pipe, fittings, manholes, specialties. Sent on request.

393. Cloth-bound Pocket-size volume, "AMERICAN PIPE MANUAL," 140 pages, standard specifications and valuable pipe information. Published by the American Cast Iron Pipe Company, P. O. Box 151-2, Birmingham, Ala.

394. Standard specifications for Cast Iron Water Pipe, De Lavand, and Special Castings, adopted from American Waterworks Association and American Cast Iron Pipe Company, Box 151, Birmingham, Alt.

395. American Standards for flange fittings and standard specifications for Cast Iron Pipe adopted by American Waterworks Association and American Gas Association. Booklet by Glamorgan Pipe & Foundry Co., Lynchburg, Va.

395-A. B. Nicoll & Co. issue a new bulletin describing the plants and products of Pont-à-Mousson, manufacturers of cast iron pipe. Tables of weights and specifications are included. B. Nicoll & Co., 294 Madison Avenue, New York City.

Pipe Concrete

395-B. "The Story of Tulsa's Spavinaw Project," "Bringing 'C' Up to 140 *Plus*," and General Catalogs on Lock Joint Reinforced Concrete Pressure and Sewer Pipes. Lock Joint Pipe Co., 16 Rutledge Ave., Ampere, N. J.

Pumps

396. Pumps of all kinds and for all municipal and industrial purposes illustrated with specifications, also engineering tables of pressure and heads. Bulletins issued by Goulds Manufacturing Company, Seneca Falls, N. Y.

397. A valuable booklet containing hydraulic tables, tables showing head, capacity, speed and horse-power relative to discharge and suction diameters for pumps with 33 illustrations. Write Aurora Pump and Manufacturing Co., Aurora, Illinois.

398. A full line of Pumps for every municipal purpose, manufactured by Economy Pumping Machinery Co., 99 North Curtis St., Chicago. Complete bulletins containing much pump data sent upon request.

399. The Edson Manufacturing Corporation, Boston, describes its improved designs in diaphragm pumps, both hand and power; odorless force pumps, and suction hose for the same and other pump accessories. 9 pages, 8½x11.

Lead Melting Furnaces

401. Aeroil "Smokeless" Lead Melting Furnaces, kerosene as fuel, detachable burner will also melt lead joints, described in Bulletin 28 by Aeroil Burner Company, Hudson Ave., Union City, N. J.

402. In five different sizes, melting 200 lbs. of lead in 20 minutes, described in Bulletin 1001, issued by Hauck Manufacturing Company, 147 Tenth Street, Brooklyn, N. Y.

Pipe Jointing Materials

410. Leadite as an economical composition for pipe joints described in a bulletin by the Leadite Company, Land Title Building, Philadelphia, Pa.

Pumping Engines

415. "When Power Is Down," by the Sterling Engine Company, Buffalo, N. Y., gives illustrations from various cities of Sterling Pumping Engines in use, with recommendations of models for standby services.

Sluice Gates

420. Sluice Gates of all kinds, Roller Bearing Pedestals, Hoisting Standards, Intake Gates, Plug Drain Values and other Water Works Appliances described in catalog by Coldwell-Wilcox Company, Newburg, N. Y. 34 pages, 8x10½.

Tapping and Valve Machines

421. The A. P. Smith Company of East Orange, N. J., furnish descriptive matter dealing with their many labor saving devices as the Smith tapping machine, valve inserting machine and pipe cutting machines.

Valves

426. A complete catalogue of more than 100 pages containing descriptions, illustrations, specifications and price list of valves, watergates and hydrants for every purpose, mailed on request. Kennedy Valve Mfg. Co., Elmira, N. Y.

427. A bulletin describing valves and valve boxes with prices of various sizes, issued by the Iowa Valve Co., Security Bldg., St. Louis, Missouri.

MISCELLANEOUS

432. "Property Protection Fencing," by the Cyclone Fence Company, offices Cleveland, Fort Worth, Newark, N. J., Portland, Ore., Oakland, Cal., Waukegan, Ill., illustrates durable chain-link man-proof safety fences for property protection.

433. Cyclone "Road Guard" chain-link fencing for protecting motorists on dangerous curves and embankments is described in folders by Cyclone Fence Company, offices Cleveland, Ohio; Newark, N. J., and other cities.

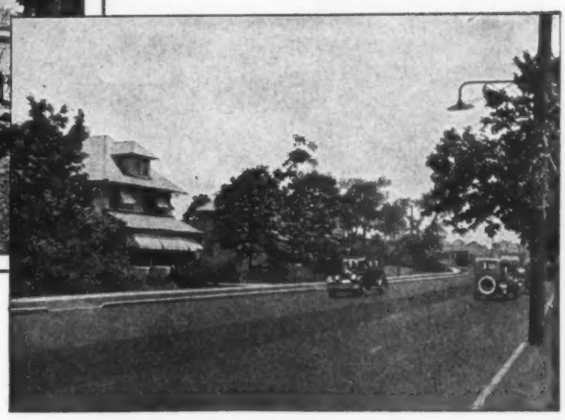
440. The Lufkin Rule Company, Saginaw, Mich.; New York; Windsor, Canada. Manufacturers of Measuring Tapes, Boxwood Rules, Spring Joint Rules, Straight and Folding Steel Rules, Fine Mechanics' Tools. General catalog No. 11.

461. Chlorine and Salts for purification of water and disinfection of sewage with description of Pennsylvania Salt Manufacturing Company's facilities for supplying these cheaply. Booklet, 15 pages, 3½x6. Widener Building, Philadelphia.

462. Cement Bag Cleaners. Small economies which become big savings are described in folders by the Handy Sack Baler Company, Marion, Iowa. Makers of Perfection Sack Cleaner for saving adhering contents of cement bags.

466. Protection for bridges, smoke stacks and all metal work by painting with silica-graphite is explained in three illustrated booklets, 3½x6½, by the Joseph Dixon Crucible Co., Jersey City, N. J.

Stephenson Boulevard, New Rochelle, N. Y., July 8, 1924.



Stephenson Boulevard. Tarvia-built, July 10, 1924.

Taking the "D - - -" out of "Detour"—

Tarvia Service *Chapter XII*

DETOUR! To motorists it stands for a round-about, disagreeable, time-wasting trip. To merchants it often means serious loss of business.

While occasionally detours are unavoidable, they should be of short duration only.

Tarvia solves this paving problem satisfactorily for all concerned. For a Tarvia road can be laid so quickly that detours are short-lived. No extended periods of conditioning after Tarvia construction. No long waiting before the new pavement can be opened to traffic. To sum up—

When a Tarvia road is "*down*," it's "*open*."

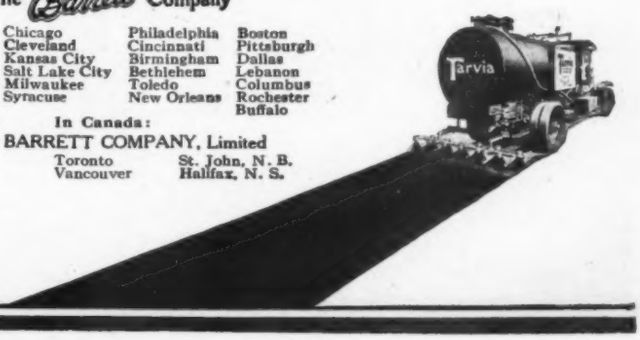
Tarvia
For Road Construction Repair and Maintenance

The Barrett Company

New York	Chicago	Philadelphia	Boston
St. Louis	Cleveland	Cincinnati	Pittsburgh
Detroit	Kansas City	Birmingham	Dallas
Minneapolis	Salt Lake City	Bethlehem	Lebanon
Youngstown	Milwaukee	Toledo	Columbus
Baltimore	Syracuse	New Orleans	Rochester
Providence			Buffalo

In Canada:
THE BARRETT COMPANY, Limited

Montreal	Toronto	St. John, N. B.
Winnipeg	Vancouver	Halifax, N. S.



CATERPILLAR
REG. U.S. PAT. OFF.

BONUS

Time saved is money earned

"CATERPILLAR" TRACTORS supply power to build and maintain roads.

But their *dependability* earns an extra premium.

They ask few favors of the weather.

They don't sulk at overtime.

Completion of a job on schedule time frees equipment for a *new* job!

Ask the nearest dealer—we'll gladly tell you who he is.

CATERPILLAR TRACTOR CO.

Executive Offices
SAN LEANDRO, CALIFORNIA, U. S. A.

Factories: San Leandro, Calif.
Stockton, Calif., Peoria, Ill.

Offices: New York City
San Francisco

Successor to

BEST — C. L. Best Tractor Co.

The Holt Manufacturing Company — HOLT

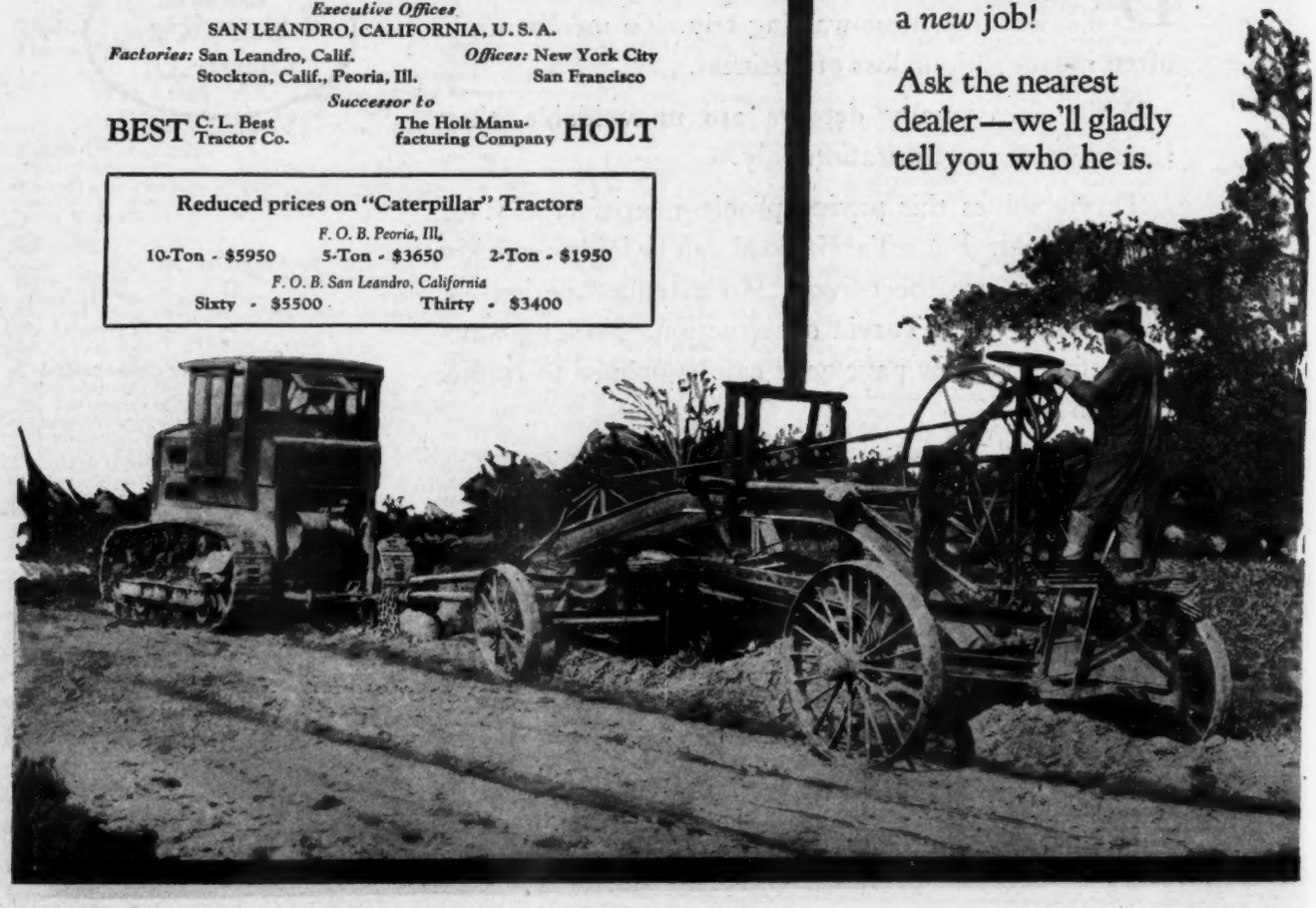
Reduced prices on "Caterpillar" Tractors

F. O. B. Peoria, Ill.

10-Ton - $5950 5-Ton - $3650 2-Ton - $1950

F. O. B. San Leandro, California

Sixty - $5500 Thirty - $3400



108-1225

BITUROC
KENTUCKY ROCK ASPHALT
TRADE MARK

RESURFACE

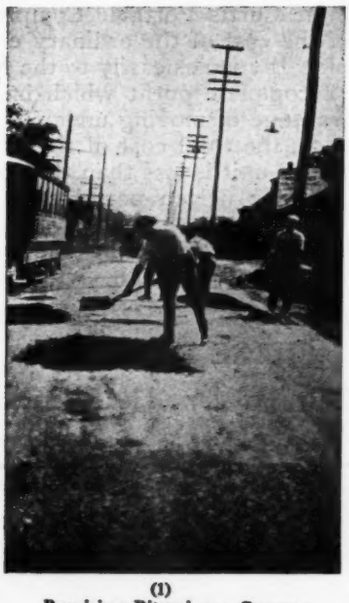
with a paving material which is reasonable in initial cost—is easy to lay—is waterproof, dustproof and almost skid-proof—and, more important still — is a PERMANENT improvement.

Use
Kentucky Rock Asphalt
INVESTIGATE!

National Highway, Richmond, Ind.
Macadam Resurfaced with BITUROC.

OHIO VALLEY ROCK ASPHALT CO.
INCORPORATED
517-18 STARKS BUILDING LOUISVILLE, KY.

COLD PATCH



(1)
Repairing Bituminous Concrete

(2)
Same, two months later, showing repairs after being consolidated by travel

HEADLEY No. 1
AN ASPHALTUM EMULSION

For repairs and resurfacing.

No expensive heating plant required.

Can be used in wet or dry weather.

No time lost account wet materials.

Write for descriptive booklets.

ASPHALT AND ROAD OIL

HEADLEY GOOD ROADS CO. FRANKLIN TRUST BUILDING PHILADELPHIA, PA.

Do You Want a Thoroughly Designed Cab—

or the haphazard product of a Local Builder?

COMPETENT engineers have designed Highland Cabs to meet in detail the exact conditions under which your cab will be used. There is a reason behind even the smallest features of construction.

Highland cabs have clear vision because they contain a good grade of glass instead of celluloid that scratches easily and turns color. They have no corner posts and the blind spot has been reduced to an absolute minimum so the driver can see what he is doing in traffic — and avoid accidents.

Easily made adjustments enable the cab to be used fully open, fully closed, or half open according to conditions. Any change takes only a second.

Doors and windows slide out of sight. They do not swing wide open — for that in itself is often the cause of accidents. Long material that overhangs in front beside the cab can be loaded and still the driver can get in and out.

The doors are wide and easy to pass through. There is plenty of room inside. The seat and lazy back are wide, deep and soft. The patent steel construction is as noiseless and rattle free as can be built. The job is neat, trim and makes a splendid impression on your customers.

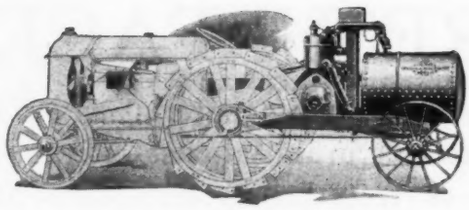
The Highland Cab is made not merely of metal and wood. Some high-grade thinking went into it. Yet because it is made in thousand lots and sold everywhere it costs no more than a make-shift job.

Every truck manufacturer or dealer can supply Highland cabs. Insist on Highland and get the greatest cab value ever offered. For trucks now in use our local distributors in most cities can supply you. Write for prices and the name of your nearest distributor.

THE HIGHLAND BODY MFG. CO.
404 Elmwood Place, Cincinnati, O.

HIGHLAND *Cabs*

CURTIS
Portable Compressor *for* FORDSON



Improved Design at a Remarkably Low Price

The need for a dependable portable compressor at a low price for the economical operation of pneumatic tools has been met by the Curtis Portable Compressor. The same high qualities are incorporated that have made these compressors standard equipment in thousands of industrial institutions.

Quality of the Curtis Portable Compressor was the first consideration—not price. The development and standardization of an improved design coupled with ample manufacturing resources, effected a saving through quantity production which has made quality possible at low cost.

The Curtis Portable Compressor is neither too small nor too large for the average job. It operates two ordinary size paving breakers, one to two rock drills, three back fill tampers, three riveting hammers and practically all tools that have proven the most economical to operate wtih compressed air.

You can buy the Curtis Portable Compressor for about half the cost of the ordinary engine driven portable. It couples easily to the Fordson, making a complete outfit which has the additional advantage of moving under its own power. Even so, the total cost of the Curtis-Fordson combined unit is less than the cost of the ordinary engine driven portable.

Illustrated Bulletin C-4-B describes the Curtis-Fordson combined unit in detail—write for it.

SPACE E-20

Road Show, Chicago, Jan. 11-15 (incl.), 1926

Mail this coupon for free illustrated booklet.

CURTIS Pneumatic Machinery Company,
1628 Kienlen Avenue, ST. LOUIS
Branch Office: 532-Z Hudson Terminal. New York.

Gentlemen:—Please send me full details on the Curtis Portable Compressor, your proposition and prices.

Name.....

Address.....

Have you a Fordson?.....

Character of work.....

Dealer's name and address.....
(If you are a dealer, please state.)

Russell Motor Patrol No. 2

One Man Machine—Fordson Tractor for Power

A Better Built Motorized Patrol Grader. It's new—it's fast—built to meet the growing demand for a more highly finished maintenance grader—a better machine for better work.

Has tight fitting machine cut gears, machined bearings with take-ups in the control connections, more accurate and easy adjustments and sturdy construction of oversize parts. It has been tried and tested to the entire satisfaction of everyone and is surely proving another demonstration of our claim—*"If It's Russell Built It's Right"*.

Fordson tractor for power. Low speed for grading and scarifying, intermediate for maintenance work, high speed for moving from place to place and light maintenance work. Independently adjustable scarifier. Large front wheels and long wheel base. Ball and socket in lifting links. Worm and gear fully enclosed. Length of blades 8, 10 and 12 ft. Weight 8050 pounds complete including tractor and scarifier. Canopy top if desired.

The complete Russel Line for road construction, road maintenance and road repairing includes—

8 Sizes Road Machines—
2 Sizes Elevating Graders—

Maintenance Patrol Machines for both Motor and Horse Power, Scarifiers, Road Drags and Wheel Scrapers, Drag Lines, Gravel Screening, Crushing and Loading Equipment, Steel Beam Bridges, etc.

Our 72 page catalog of special interest to all road builders—sent free and postpaid.

Russell Grader Manufacturing Company
FACTORY AND GENERAL OFFICES
MINNEAPOLIS, MINN.

Affiliated Plants—Cicero, Ill., North Kansas City, Mo., Memphis, Tenn., Dallas, Tex.

For
CONCRETE CURING

CALCIUM CHLORIDE

The old laborious and expensive methods of curing concrete by ponding or by blanketing with dirt and straw and sprinkling with water, are entirely done away with by the up-to-date Calcium Chloride method of concrete curing.

Solvay Calcium Chloride **is applied** direct to the bare concrete and requires no attention, no sprinkling, no dirt, no straw. Roads are ready for service in half the time required by former methods.

SOLVAY
Flake
Calcium Chloride

Solvay is shipped in 375-pound non-returnable metal drums, or easy to handle 100-pound, moisture-proof, burlap, paper-lined bags.

Seventy-five convenient distributing points in the United States give prompt service with minimum transportation charges. It will pay you to use Solvay. Write for latest information at once!

Ask for Booklet No. 4851

Don't forget that Solvay accelerates the set of concrete and can be used often to advantage in the mix.

The Solvay Process Company

WING & EVANS, Inc., Sales Department
40 RECTOR STREET NEW YORK CITY

Boston Syracuse Chicago Indianapolis
Cleveland Cincinnati Pittsburgh Detroit
Philadelphia Kansas City St. Louis

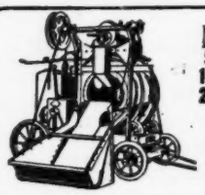
ONE BAG TILTER NOW AT HALF BAG PRICE

BETTER EQUIPMENT FOR LESS MONEY ON ACCOUNT
BIG FACTORIES—VOLUME PRODUCTION—BUYING POWER

WRITE OR WIRE FOR NEW PRICES—CATALOGS—TODAY

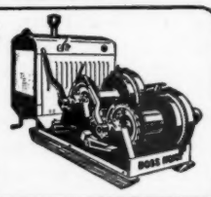
THE AMERICAN CEMENT MACHINE CO., INC.
KEOKUK — IOWA

BRANCH OFFICES AND WAREHOUSES IN ALL PRINCIPAL CITIES



MIXERS
55 · 7S
10S · 14S
21S · 28S
GAS
STEAM
ELECTRIC
ALLEY
STREET
PAVER

HOISTS
SINGLE AND DOUBLE DRUM REVERSING
$135 UP
FORDSON WINCHES



UNION-PILE-HAMMERS
DRIVE AND PULL

The Biggest Jobs have used

UNION PILE HAMMERS

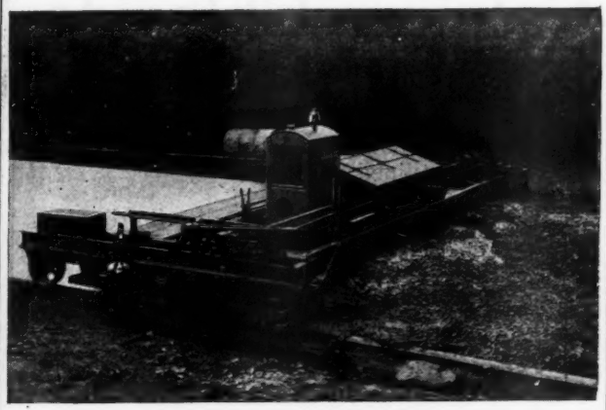
Built in Sizes 195 lbs. to 28,000 lbs.

Send for Catalog

UNION IRON WORKS

601 NEWARK STREET
HOBOKEN, N. J.

ORD
Concrete Road Finisher



SAVES MEN, CONCRETE, MONEY, WORRY

Ask Any Contractor or Engineer Who Has Used One

For full information address

A. W. FRENCH & COMPANY

Manufacturers The ORD Concrete Road Finisher

8440 Lowe Ave. Chicago, Ill.

AURORA

DEEP WELL TURBINE PUMPS AND POWER HEADS

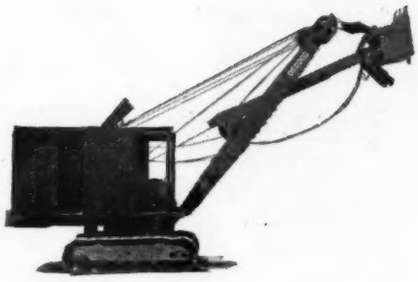
EFFICIENT
DEPENDABLE
SIMPLE
LOW MAINTENANCE

Write for Catalog—or Let Our Engineer Call

AURORA PUMP & MFG. CO.
AURORA, ILL.

SALES BRANCHES IN ALL LARGE CITIES

OSGOOD



Shovels, Clamshells, Cranes, Draglines.

Steam, Gas, Electric, Oil.

Revolving & R. R. Types on Continuous Treads or Traction Wheels.

THE OSGOOD COMPANY
MARION · OHIO · U.S.A.

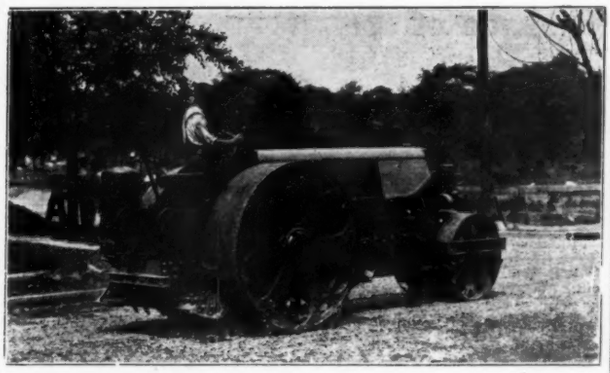
Showing Barton Portable Pump installed on Ford car, draining sewer ditch. Only one of the many uses of this pump.

Do Your Pumping with a BARTON Portable Pump

No longer is it necessary to use cumbersome, expensive pumping equipment. The Barton Portable Pump is quickly and easily attached. Is simple to operate and always ready for service. It has proven practical and efficient in every capacity. It will deliver up to 750 gallons per minute. Is equipped to handle sand, small pebbles, and cinders without damage to the pump. An Automatic Primer primes the pump and keeps it primed. From these features it is evident this pump is well adapted to the requirements of Public Works Departments.

Write for Bulletin 56

AMERICAN STEAM PUMP CO.
BATTLE CREEK :-: MICHIGAN



"Would Buy Another Huber If"—

"Our Huber Motor Roller gives entire satisfaction under all conditions. I would buy another Huber if in the market for I have found it economical, easy to handle and plenty of power for any needs of contracting."

Losey Road Construction Co. (Kenton, O.)
R. E. Ratcliff, Sec'y and General Mgr.

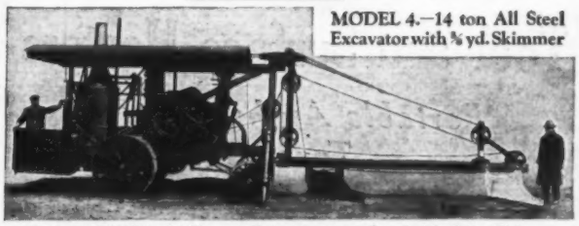
Write us for more information.

THE HUBER MANUFACTURING COMPANY
108 Center Street, MARION, OHIO, U. S. A.

HUBER ROAD TOOLS
MAINTAINERS - ROLLERS

STEAM KEYSTONE SHOVELS

TRADE MARK REGISTERED U. S. PATENT OFFICE



MODEL 4.—14 ton All Steel Excavator with ⅝ yd. Skimmer

The KEYSTONE is a highly versatile traction steam shovel with all the efficiency of specialized design, usable with three different interchangeable scoops—*Skimmer, Ditcher and Clam Shell*—for Road Grading, Trenching, Back-Filling, Cellar Digging, Pit Mining, Loading, Unloading and Handling Materials. Can be equipped with electric motor drive for use in buildings. Saves first cost, moving cost and upkeep and is readily sold or rented for any sort of excavation job. A reliable road shovel of remarkable adaptability to other uses.

The heavy Keystone Skimmer Bucket, ⅝ yd. capacity, has a horizontal crowd of 14 feet and fills itself at one shot in a six inch cut. It leaves a smooth surface, finished to grade and thus dispenses with costly hand-trimming. Shallow digging in hard material—old macadam, paving blocks, concrete and asphalt—is keystone work.

Made in two sizes: Model 3, 10 ton and Model 4, 14 ton. The good Keystone Digging Ideas in our catalogs and advertising sheets have made money for 1500 Contractors in the United States. Ask for them.

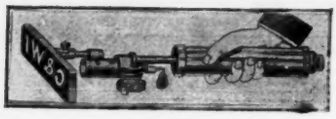
Model 4, with Boom extension and ½ yd. Clamshell Bucket.

Ditcher

Keystone stands on the solid. No cribbing needed, no danger from cave-in, of machine sliding into excavation. Any width or depth to 20 feet. There is 4 feet of water in this 12 foot ditch. The Keystone is adapted for hard going among roots, boulders, etc., and cleaning out blasted rock.

***Keystone Driller Company*, Beaver Falls, Pa.**
170 Broadway, New York Monadnock Block, Chicago Joplin, Mo.

At THE ROAD SHOW the NEW KEYSTONE will be found in the Annex. See it.



Branded For Life

Tools scattered about the job or along the street are a temptation to passersby and pilferers — unless they are marked the Everhot Way. Brand your tools and equipment with the Everhot Combination Outfit and the evidence of your ownership is there for life. It cannot be covered up, destroyed or effaced.

This is the way to stop the constant replacement of costly tools and equipment which cuts down your profits every year.

The Everhot Combination Outfit includes a gasoline torch to which the brand is attached, and also a soldering iron. Brands or solders continuously—always ready for use.

Each piece of your property branded becomes a perpetual advertisement of your business.

Write for full details and low prices.

EVERHOT
America's Brand Makers
MANUFACTURING CO. MAYWOOD, ILLINOIS

O·S·DEPENDABLE
CRANES - SHOVELS - BUCKETS

Manufacturers of O-S Locomotive Cranes, Flexible Tread Cranes, Truck Cranes, Gantry Cranes, Clamshell and Orange Peel Buckets. Write for catalogs.

ORTON & STEINBRENNER CO. 608 S. Dearborn St. Chicago - Illinois

Chausse Oil-Burning Tool and Surface Heaters

Portable Asphalt Plant Torches

Illustrated Circulars on Request

CHAUSSE OIL BURNER COMPANY
1227 W. Beardsley Ave. ELKHART, IND.

Real Source of Profit

An undeniable source of profit for road contractors is found in the use of the

BURCH SPREADER

Users tell us it pays for itself in a mile, and it certainly spreads road material more evenly and far more economically.

Burch Unloaders, for car use or of the portable variety, are two other great money makers.

Write us about these.

THE BURCH PLOW WORKS COMPANY
DEPT. CRESTLINE, OHIO

MR. SEWER CONTRACTOR

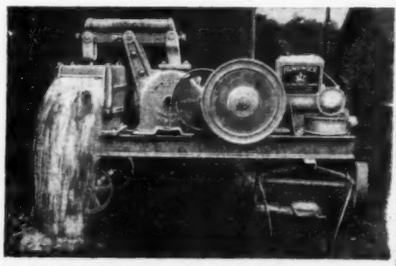
Did You LOSE Last Year?

You had good machines, but you struck wet going and some of it was deep. You had to timber and there wasn't room to handle things. You didn't know that you could save $60.00 to $100.00 per day by using a

MORETRENCH CONVEYING EXCAVATOR

Proof? Plenty of it. Write us.

MOORE TRENCH MACHINE CO.
ROCKAWAY, NEW JERSEY



3" open type—5500 G.P.H.

The new HUMDINGER pumps herald the coming tendencies of power diaphragm pump design.

At present they are the only ones with the combination of non-clogging ball valves, bronze bushed bearings and enclosed driving gears running in oil—all of which are vitally necessary toward maximum operating satisfaction.

HUMDINGER Contractors Pumps

Manufactured in all sizes, both open discharge and lift and force types. Write for descriptive literature and prices.

RALPH B. CARTER CO.—NEW YORK, N. Y.

CUMMER ASPHALT PLANTS

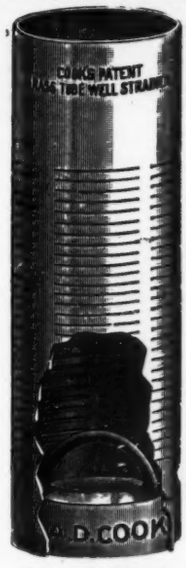
All Styles—All Sizes

Railroad—Portable (3 Unit) Semi-Portable and Stationary

Over four hundred in successful operation.

CUMMER PLANTS NEVER WAIT FOR HOT SAND

The F. D. CUMMER & SON CO., Cleveland, Ohio



If You Have a DEEP WELL ending in WATER-BEARING SAND OR GRAVEL.

equip it with the COOK PATENT BRASS TUBE WELL STRAINER and secure the maximum capacity of the well free from sand or particles of any kind. These strainers are in use by the Department of Water Supply of New York City, Parkersburg, W. Va., Memphis, Tenn., and Dayton, Ohio.

Upon the completion of the well, allow us to quote upon a Steam Belt or Motor Driven Deep Well Pumping Outlet.

Write for New Catalogue

A. D. COOK, Incorporated Lawrenceburg, Ind., U. S.

DIXON'S SILICA—GRAPHITE PAINT

is a natural combination of silica and flake graphite.

The vehicle is pure boiled linseed oil. It will not crack or peel off because of the natural elasticity of the flake graphite, while the silica furnishes the wear-resisting qualities.

Because of these qualities, Dixon's Paint affords better and longer protection. By making frequent repainting unnecessary, it lowers the cost of paint upkeep.

Write for Booklet 102-B

JOSEPH DIXON CRUCIBLE CO.

JERSEY CITY, N. J.
Established 1827

"STEWART SEWER CLEANING MACHINE"
"Used in Nearly Every State in the Union"

SEWER RODS

We pay freight and ship for trial. Who else will do it?

W. H. STEWART

1814 Locust Street, St. Louis, Mo.
133 George Street, Boston, Mass.

ASPHALT PLANTS

PORTABLE, STATIONARY, RAILROAD, SAND DRYERS

Either Direct Heat or Internal Flame

The

J. D. FARASEY MFG. CO.
CLEVELAND, OHIO

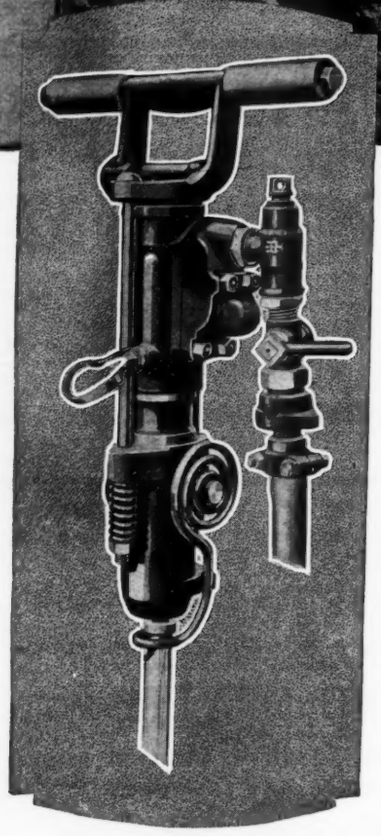
A TIME, LABOR AND MONEY SAVER

Many contractors found it a money-making proposition to install a Unit Sack Cleaner and Handy Sack Baler on their job.

The Machine pictured in the cut cleaned several hundred thousand sacks and paid for itself on this job alone.

It is only a matter of time before you will realize the necessity for our equipment. Why not write us immediately for further details?

HANDY SACK BALER COMPANY, MARION, IOWA
Pioneer manufacturers of sack equipment.



"Jackhammer" Rock Drills operated from Ingersoll-Rand Portable Air Compressor

The Most Work Done
for the Lowest Operating Cost

Rock removal is speeded up—and the cost lowered—when "Jackhamer" Rock Drills and Ingersoll-Rand Portable Compressors are used.

It is easy to move such a rock drilling plant to the job and put it into service. Crank up the engine, connect up the "Jackhamer" Drills, and you are ready for work. No pipe lines need be laid. Just move the compressor along with the drills. When one contract or job is completed, your plant is ready to go on to the next.

A "Jackhamer" will drill holes as deep as 25 feet and drill them faster and better than any other type of rock drill. No set-up required, no heavy equipment to move, no helper needed. One man can operate the drill and carry it.

There are six sizes of "Jackhamer" Drills and six sizes of Portable Compressors. The correct rock drilling plant, therefore, can be selected to suit the individual needs. Both drills and compressors are furnished by the Ingersoll-Rand Company, which assumes undivided responsibility for the successful operation of the complete unit.

ANNUAL CONVENTION AND ROAD SHOW
AMERICAN ROAD BUILDERS ASSOCIATION
JANUARY 11-12-13-14-15
1926
CHICAGO, ILL.

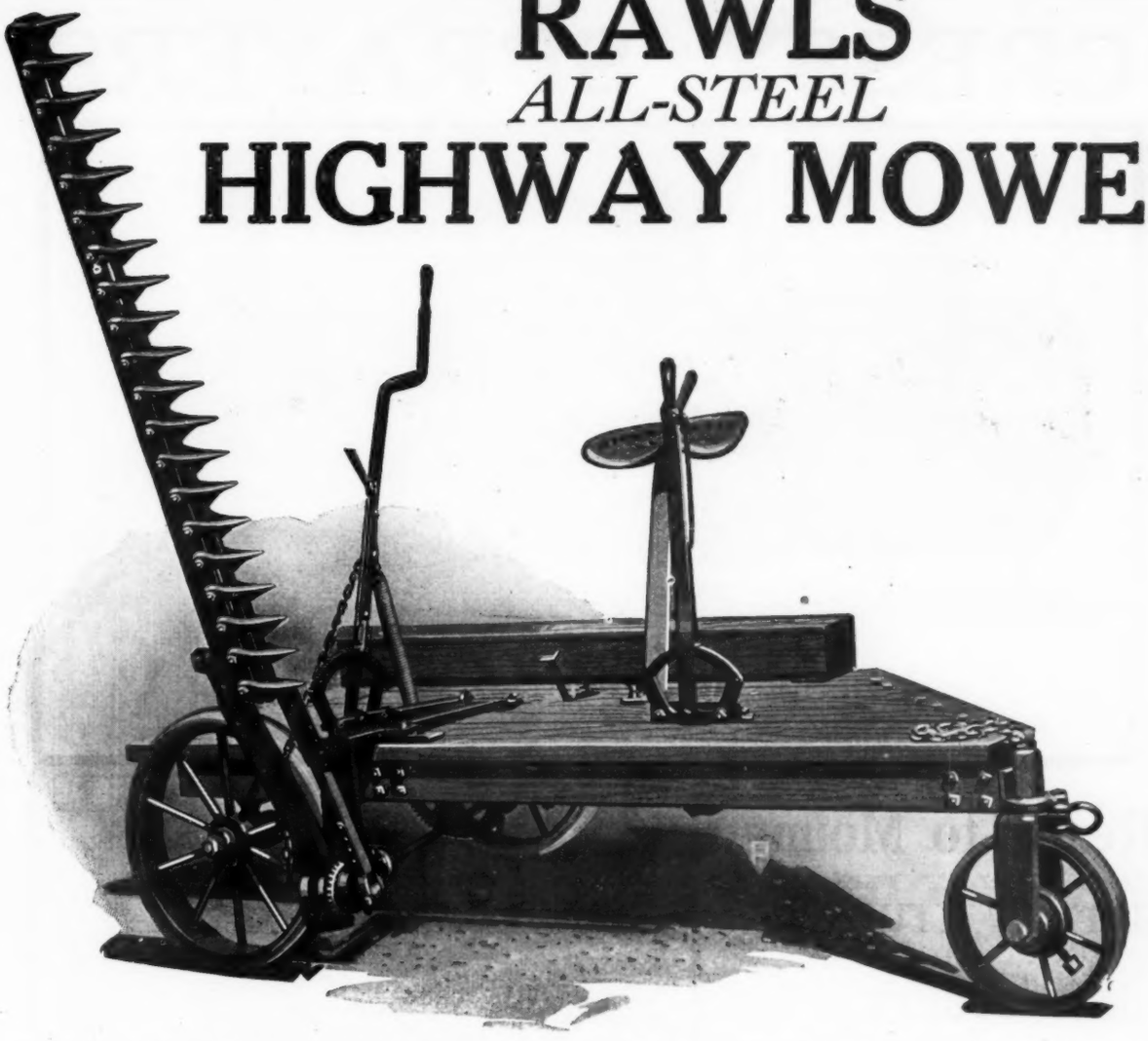
INGERSOLL-RAND COMPANY—11 BROADWAY, NEW YORK CITY.

Offices in principal cities the world over

FOR CANADA REFER—CANADIAN INGERSOLL-RAND CO. LIMITED, 260 ST. JAMES STREET, MONTREAL, QUEBEC.

Ingersoll-Rand

RAWLS
ALL-STEEL
HIGHWAY MOWER



You want results, of course—you want them at the lowest possible cost consistent with good work—taxpayers demand economy as well as efficiency.

In these demands the Rawls All-Steel Highway Mower proves more than satisfactory. Equipment already on highways in 15 States. From one to one hundred and two machines on ninety railroads in eight different countries. Equipment in service eight years.

Recent shipments to our old customers include 45 machines to one road and 24 to another; this growing popularity is due to the tremendous satisfaction they give wherever used.

Every part is designed for maximum efficiency and made of high grade wear-resisting material to insure long, trouble-proof, economical service.

Cuts any angle—Horizontal, declining or inclining.
Demounts automatically when obstructions are met.

SPECIFICATIONS

Solid Rubber Tire Steel Wheels.
Hyatt Roller Bearings on Axles.
5, 6 or 7-foot Cutterbar.
All Steel Castings.
4" Channel Steel Frame.
2" Floor.
1 7/16" Steel Axles.
9 ft. Length Overall.
Cold Rolled and Nikrome Steel Drive Shafts.
Movable Parts fitted with Manganese Bronze Bushings.
Speed 6 to 8 miles per hour while mowing—equivalent to 3 to 4 gray iron farm mowers.
Weight 1000 pounds.

Write for Descriptive Literature

RAWLS MACHINE & MFG. WORKS

1412 North Halsted Street **Chicago, Ill.**

Cable Address: Rawlsmachy, Chicago **Codes: A. B. C. 5th Ed. and Private**

CRESSY SPRAYERS

Ready to Mount on any Truck or Trailer

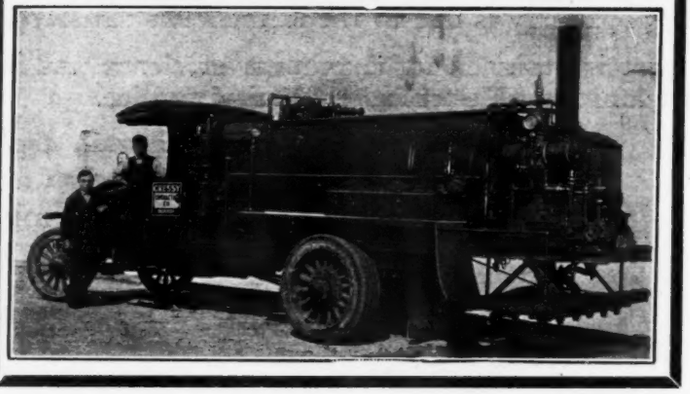
Spray either asphalt or heavy tar uniformly. Direct air pressure regulates the flow.

Heat any material without burning. All heating is by steam coils, which will keep up an even temperature for days.

Load or spray without clogging pumps. It loads by vacuum and discharges by air pressure.

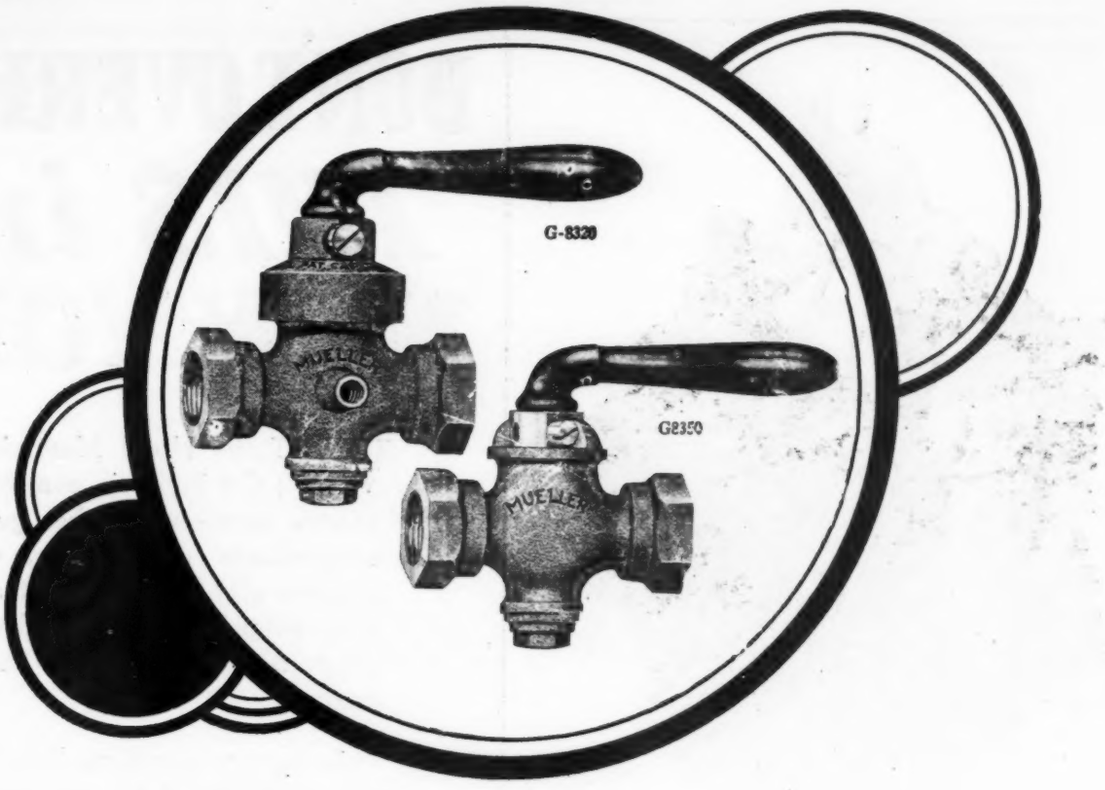
IT IS THE ONLY SPRAYER THAT PROVIDES A MEANS OF HEATING AND CLEANING THE SPRAY PIPES.

Write for our interesting booklet.



CRESSY ROAD SPRAYER MFG. CO.

452-470 Second Street ***Everett, Mass.***



Carefully ground keys insure leak-proof service

The keys in Mueller stops, and stops and drains, are ground like the valves in your car. Each key is ground to fit the particular stop, or stop and drain, in which it is inserted. As a result, their perfect fit insures leak-proof service and easy opening and closing. The same high grade workmanship is observed in every detail. Thorough inspection and testing prevent any deviation from Mueller standards.

The stop, and stop and drain, above are typical of Mueller's complete line, which includes every type needed for waterworks use. Mueller's sixty-eight years' experience in the waterworks field has afforded exceptional opportunity for knowing your needs. On this knowledge we base our claim for giving you superior service.

MUELLER CO.
(Established 1857)
Factories: Decatur, Illinois; Port Huron, Michigan
Canadian Factory:
MUELLER, Limited, Sarnia
Branches:
New York, San Francisco, Los Angeles

MUELLER

Build Sewers for all time...

CLAY Pipe will last indefinitely; it can't wear out. Time and the elements do not weaken it. Traffic shock does not harm it.

Healthful conditions depend upon reliable sewers. Safeguard your community and lay Vitrified Salt-Glazed Sewer Pipe—it lasts.

Clay Products Association
Chamber of Commerce Bldg.
Chicago

VITRIFIED Salt Glazed CLAY
Sanitary Sewer Pipe PW12-F-RTG

DON'T OVERLOOK *THIS in* NEW YORK

VISIT the Hotel Martinique—look the inviting, comfortable rooms over—note the genuine convenience of location, where you are right in the heart of the busy shopping district and within easy distance of all business centres.

In fact, you can go direct from the Martinique to any place in New York without stepping out of doors (via enclosed subway from basement).

You will be surprised at the unusual rates of this popular New York Hotel. You can enjoy all the comfort and convenience of the Hotel Martinique at rates as low as $2.50 per day.

Club breakfast at 45c—table d'hote dinner at $1.25—also a la carte at unusually moderate prices.

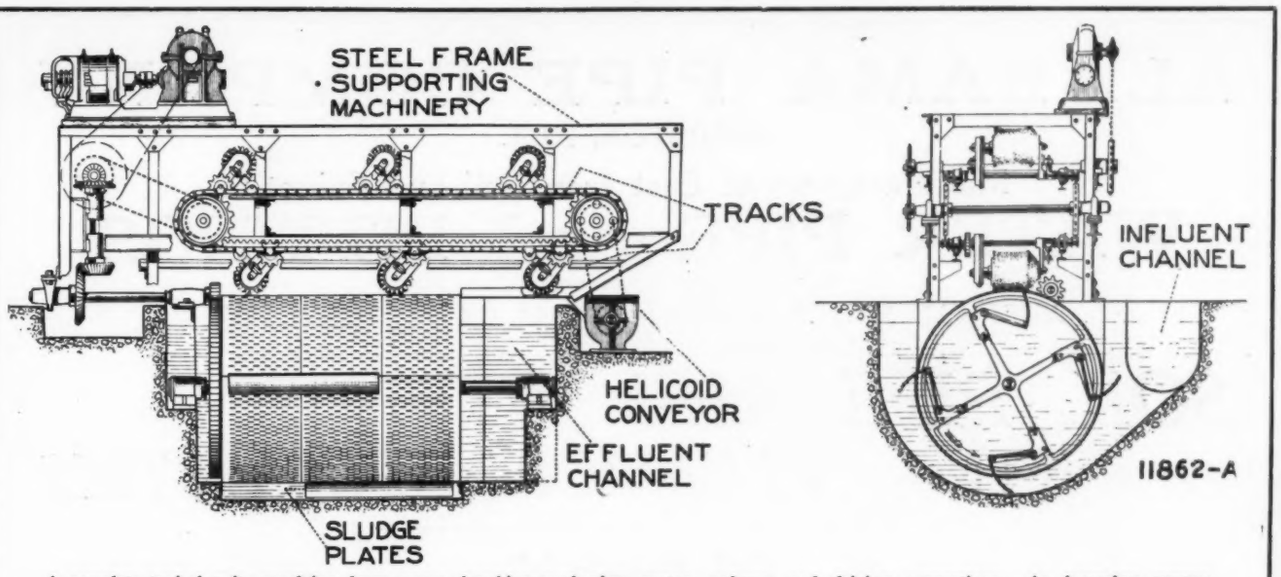
A. E. SINGLETON, Res. Mgr.

"The BEST without extravagance"

Hotel Martinique

Affiliated with Hotel McAlpin

Broadway~32nd to 33rd Sts.
NEW YORK



A complete typical unit—revolving drum screen, brushing mechanism, motor, reducer, and driving connections. As incoming sewage reaches the chamber, the liquid portion passes into the screen through the fine openings, and out at the effluent end of the drum; while the solids carried up on the outside are swept off by the brushes. Solids which drop down in the chamber are picked up by the sludge reclaiming plates, and delivered to the brushes; the plates withdrawing in time to avoid interference.

Tark Sewage Screen

For the Clarification of Municipal and Industrial Sewage

EIGHT OF THESE SCREENS, with a combined capacity of 317 million gallons daily, are installed in the Fine Screen House, forming part of the Activated Sludge Sewage Disposal Plant at Milwaukee (T. Chalkley Hatton, Chief Engineer)—the largest activated sludge plant in the world.

ONE OF THESE SCREENS is installed in the Sewage Treatment Plant (Remington & Vosbury, Consulting Engineers), at Pleasantville, New Jersey, a little seaside town five miles from Atlantic City.

Nothing could better illustrate the adaptability of the Tark Sewage Screen to installations large and small. The fact that this drum-shaped screen can be built in any desired size, and that by the use of a larger or smaller number of identical units any volume of sewage can be handled, enables the Sanitary Engineer to plan his sewage disposal plant so that the addition of one or two screens from time to time will take care of the increased volume of sewage due to the growth of the community.

We have an interesting illustrated booklet describing the Tark Sewage Screen, a copy of which we will gladly mail you on request. In the same booklet you will find information on Link-Belt Sludge Collectors for the mechanical removal of sludge from Settling Tanks, and Link-Belt Traveling Water Screens which are used with Filtration Beds to keep the sand surface free from leaves and other refuse that would impair their efficiency.

LINK-BELT COMPANY, 2045 HUNTING PARK AVE., PHILADELPHIA, PA.

LINK-BELT

ALABAMA PIPE COMPANY

ANNISTON, ALA.

Manufacturers of Cast Iron Bell and Spigot

WATER PIPE and FITTINGS

In Strict Accordance With

AMERICAN WATER WORKS ASSOCIATION SPECIFICATIONS

SOIL PIPE AND FITTINGS
PLUMBING SPECIALTIES

TRADE ALPIGUL MARK

EVERLASTING CAST IRON SECTIONAL CULVERT PIPE

Your Inquiries Are Respectfully Solicited

Address Our Nearest Sales Office

GENERAL OFFICES—ANNISTON, ALABAMA

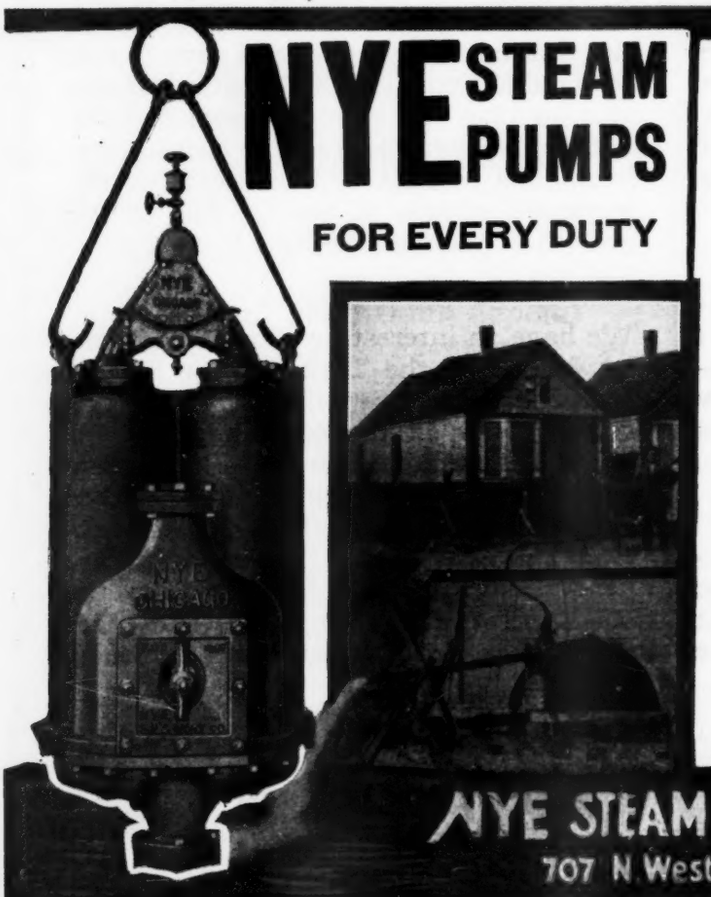
JOHN F. McCLURE
342 MADISON AVENUE
NEW YORK CITY

WM. M. BYRD, JR.
General Sales Manager
1655 PEOPLES GAS BUILDING
CHICAGO, ILL.

CHAS. STANYAN
1749 SACRAMENTO SQUARE
SAN FRANCISCO

NYE STEAM PUMPS

FOR EVERY DUTY



On one job a Nye sewage pump in connection with Imhoff Tanks was put to work at a suction pit of a pump station that had not been cleaned for six years. It was packed solid. The Nye pump drained the accumulation clean, even though there were shells all through the pit 4" and 6" thick.

NYE Pumps will not choke or clog and easily handle solids as well as liquids.

Ask any of the largest contractors and engineering companies—**they will tell you** that NYE Steam Pumps have saved thousands of dollars in time and labor.

Will operate where other pumps fail.

Consult our Engineering Department if you are confronted with a pump problem. You will find it worth while.

Write for Catalog No. 20

NYE STEAM PUMP & MACHINERY CO.
707 N. Western Ave., CHICAGO, ILL.

As good as the day it was made—Thousands of years ago.

Vitrified Clay Liner Plates in Shockoe Creek Sewer Richmond, Va.

Because salt glazed vitrified clay shows no effect of time, resists acids, alkalis, electrolytic action, decay and other elements that sewers must withstand, Richmond, Virginia, decided that Vitrified Clay Liner Plates should be used in its sewers.

For thousands of years Vitrified Clay Products have been buried in Babylon and other eastern countries. Now, unearthed, they show none of the effects that other products might naturally show.

That is why modern cities are using Vitrified Clay for sewers, chimneys, etc. We have a number of publications regarding the manufacture of Vitrified Clay Products of interest to engineers and city officials. Write for them.

For permanence:—

EASTERN CLAY PRODUCTS ASSOCIATION
Colonial Trust Bldg., Philadelphia, Penna.

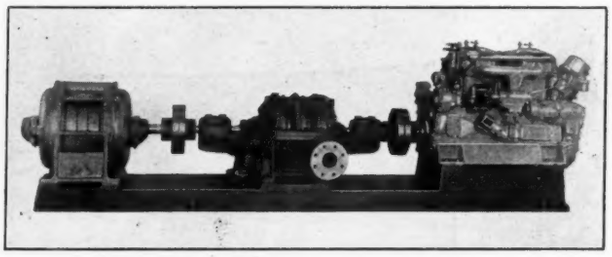
American Vitrified Products Co., Akron, Ohio
The Buckeye Fire Clay Co., Uhrichsville, Ohio
The Cambria Clay Products Co., Blackfork, Ohio
Clay City Pipe Company, Uhrichsville, Ohio
The Crouse Clay Products Co., Akron, Ohio
The Dennison Sewer Pipe Co., Dennison, Ohio
The East Ohio Sewer Pipe Co., Irondale, Ohio
The Evans Pipe Co., Uhrichsville, Ohio
The Junction City Sewer Pipe Co., Junction City, Ohio
Kaul Clay Manufacturing Co., Toronto, Ohio
The Logan Clay Product Co., Logan, Ohio
The Patton Clay Mfg. Co., Patton, Pa.
Penna. Clay Products Co., West Winfield, Pa.
Peerless Clay Manufacturing Co., Port Homer, Ohio
Portland Stone Ware Co., 49 Federal St., Boston, Mass.
The Robinson & Sons Sewer Pipe Co. Uhrichsville, Ohio
The Robinson Clay Product Co., Akron, Ohio
The Robinson Clay Product Co. of Pennsylvania Clearfield, Pa.
The Romig Clay Product Co., Uhrichsville, Ohio
The Ross Clay Products Co., Uhrichsville, Ohio
St. Marys Sewer Pipe Co. St. Marys, Pa.
Stillwater Clay Products Co., Uhrichsville, Ohio
Union Clay Manufacturing Co., Empire, Ohio
The Wolf-Lanning Clay Co., Dennison, Ohio

It must be— Vitrified Clay Pipe

Safe-guard the Water Supply

Dual drive for the important centrifugal pumps is provided in a large percentage of the 500 Sterling engine installations in waterworks.

Sterling Internal Combustion Engines



Sterling 4 cylinder, 100 H.P. engine emergency drive, on centrifugal pump, manufactured by Wheeler Condenser & Engrg. Co. Installed at Windsor Locks, Conn.

STERLING ENGINE COMPANY, Dept. C-5, Buffalo, N. Y.

High Duty Gasoline Engines up to 1000 H.P. load at 1200 revolutions.

Chemicals

For Water Purification

For Treatment of Sewage

LIQUID CHLORINE

Chloride of Lime

Sulphate of Alumina

Highest Grades. Manufactured by

Pennsylvania Salt Manufacturing Co.

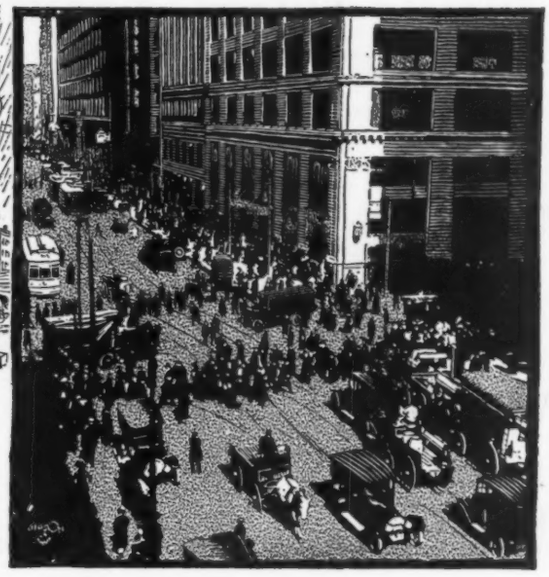
EXECUTIVE OFFICES: PHILADELPHIA

Works:

Natrona, Pa. Wyandotte, Mich. Menominee, Mich. Philadelphia

1852

State *and* Madison Streets



1922

Serving Chicago's Busiest Street for Three Generations

A Notable Example of Municipal Economy

IN 1852, Chicago's rapidly growing downtown district required new and larger water mains. The city fathers sought for a material that would solve the problem once and for all. They selected *Cast Iron* Pipe.

During the summer of 1921, the main was uncovered to connect a fire hydrant. The pipe was inspected inside and out, and found to be in *perfect* condition. A leakage test proved the entire length *absolutely tight.*

Today this same *Cast Iron* Pipe, originally the main line for the city, now seventy-three years old, is the sole supply line for the most highly concentrated retail district in the world—feeding both sides of State Street between Randolph and Madison Streets.

The grandchildren of the men who laid the pipe are drinking the water it carries—and from all appearances the identical pipe will still be on duty a hundred years from now.

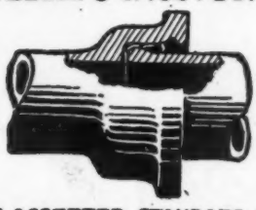
Many of the *Cast Iron* mains laid in our cities generations ago are still on duty. The thin film of oxide, which quickly forms, protects *Cast Iron* Pipe from further rust, and gives each length centuries of useful life.

THE CAST IRON PIPE PUBLICITY BUREAU, Peoples Gas Building, Chicago

CAST IRON PIPE

Our new booklet, "Planning a Waterworks System," which covers the problem of water for the small town, will be sent on request

THE BELL & SPIGOT JOINT



THE ACCEPTED STANDARD FOR UNDERGROUND CONSTRUCTION

Send for booklet, "Cast Iron Pipe for Industrial Service," showing interesting installations to meet special problems

PIPE easily and smoothly as if done in a lathe.

CUTTING

Made in 5 sizes and will cut all pipe between 4 and 48 inches in diameter.

MACHINE

Water Works Supplies

FIRE HYDRANTS

Smith Fire Hydrants are scientifically constructed to deliver the greatest volume of water under a given pressure. They are designed with easy-flow waterways without detours or obstructions which have a tendency to kill efficiency. Built strictly along hydraulic principles to meet the exacting demands of modern fire equipment. Built for rugged use. Adopted by many cities. Especially designed for high pressure service.

Specialties of the Highest Grade

DEVICES FOR FILLING SPRINKLING WAGONS

Will pay for themselves in savings effected on repairs to hydrants. Will save great waste of water, as regular hydrants when used are usually left in leaky condition. No wrenches necessary to operate. Nothing to break. Nothing to get out of order.

Send for catalogue showing full line of waterworks specialties and equipment.

The A. P. Smith Co.

East Orange, N. J.

"MATHEWS"

(REG. U.S. PAT. OFF.)

FIRE HYDRANTS

Recognized Standard for Over 50 Years

GATE FOOT AND CHECK VALVES

"Reduced" Fittings

CAST IRON PIPE

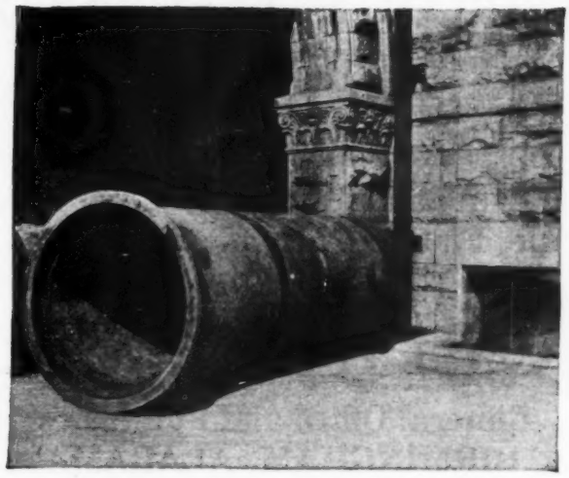
for water and gas

R. D. WOOD & CO.

Established 1803

PHILADELPHIA, U.S.A.

Smooth After Decades



CAST IRON PIPE, 48" in diameter, temporarily removed after 30 years of service. As the photograph shows this pipe still affords the maximum carrying capacity after serving the city for many years.

In most sections of the country Cast Iron Pipe retains its carrying capacity indefinitely. For the few waters that tuberculate this material can be furnished with a cement lining which effectively prevents the water from coming in contact with the metal. This eliminates the necessity for using any substitute for the accepted standard, Cast Iron Pipe.

Write for details on cement lining

United States Cast Iron Pipe and Foundry Co.

GENERAL OFFICE: BURLINGTON, NEW JERSEY

SALES OFFICES:

Philadelphia—1421 Chestnut Street
New York—71 Broadway
Pittsburgh—Henry W. Oliver Bldg.
Dallas, Texas—Magnolia Bldg.

Chicago—122 South Michigan Boulevard
Cleveland, Ohio—1150 E. 26th St., N. E.
Birmingham, Ala.—1711 American Trust Bldg.

San Francisco—Monadnock Building
Minneapolis—Plymouth Building
Buffalo—857 E. Ferry St.
Kansas City—Interstate Bldg.

CAST IRON PIPE

NATIONAL

IS MADE RIGHT

CAST IRON WATER AND GAS

PIPE

By Sand Cast and deLavaud Centrifugal Processes. Fittings Flange Pipe, Flange Fittings and Special Castings

MANUFACTURED BY

National Cast Iron Pipe Company

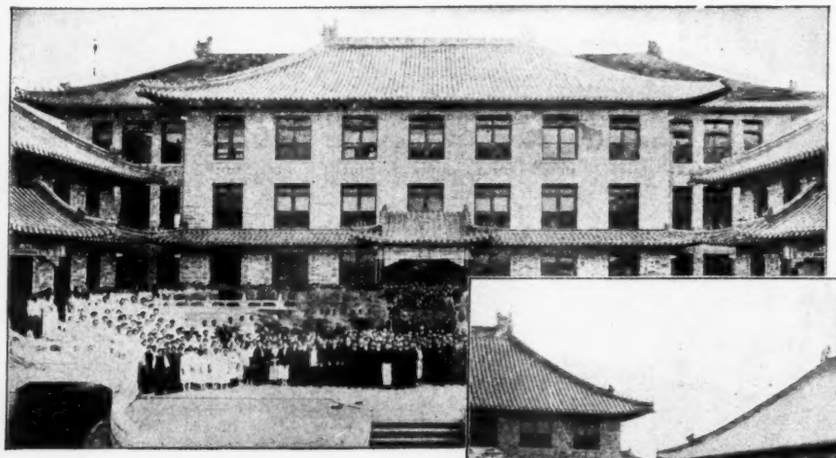
General Office and Foundries
BIRMINGHAM, ALABAMA

SALES OFFICES:

Chicago: 1231 Peoples Gas Building
Kansas City, Mo.: 603-04 Land Bank Building
Jacksonville, Florida: 610 Bisbee Building
Dallas: 1315 Santa Fe Building
Los Angeles: 903 Hellman Bank Building
Salt Lake City, Utah: 417 Kearns Building

STOCKS CARRIED AT ALL SALES OFFICES

YEOMANS IN CHINA



Part of a group of 14 buildings of the PEKING UNION MEDICAL COLLEGE Peking, China

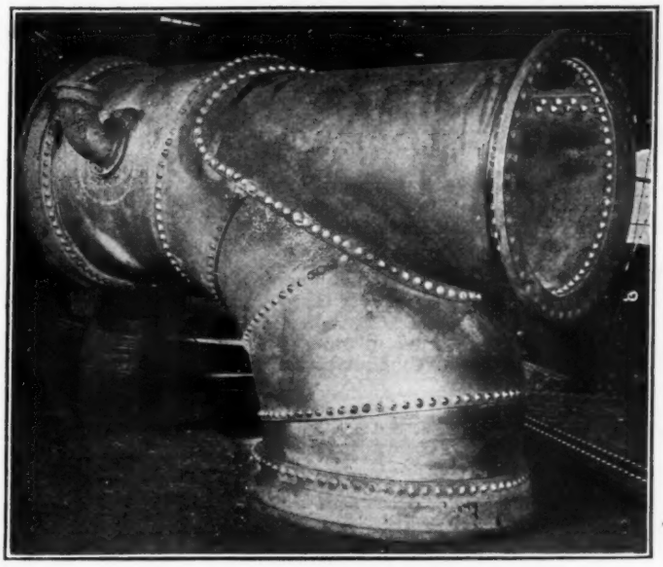
Equipment, YEOMANS Form A Duplex Centrifugal Sewage Ejector

YEOMANS Sewage Ejectors, both SHONE and YEOMANS type are giving perfect service in municipal and public building installations all over the world. There are many of these dependable sewage ejectors which have been in continuous operation for over thirty years. None have ever been discarded or replaced because of unsatisfactory service.

Our engineers will cheerfully send you specifications and details to fit your requirements.

YEOMANS BROTHERS COMPANY
1419 Dayton St. Chicago, Ill.

RIVETED STEEL PIPE



60-inch Elbow with 48-inch Outlet

is

Strong
Durable
Flexible

Bends, Ells, Tees, & Y's made of Riveted Plate

also

Stacks—Standpipes—Breechings—Tanks

In Business for 60 Years

JAMES McNEIL & BRO. CO.

PITTSBURGH, PA.

CAST IRON PIPE AND FITTINGS

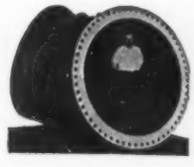
All Classes **Standard or Special**

Bell and Spigot Pipe Fittings,

20", 24", 36" and Up

Flanged Pipe and Fittings

12" and Up



Gray Iron & Semi-steel Castings,

One Pound to 20 Tons

We serve all territories

Standard Cast Iron Pipe and Foundry Company

General Offices and Works: Atlanta, Ga.

New York Sales Office: Room 913, 52 Vanderbilt Avenue

KENNEDY

HYDRANTS AND VALVES

fully proven in Municipal Service

You can be sure of permanently satisfactory operation by specifying Kennedy Valves and Hydrants. They are time-tried and have proven their goodness in numerous important installations which have demanded the best sort of service.

The high pressure systems of New York and Boston include more than 6,000 Kennedy Gate Valves. Kennedy Hydraulically-operated Gate Valves form the main valve equipment of the Mayfair Pumping Station in Chicago, and many Kennedys of various types and sizes are in use in other pumping stations in Chicago, St. Louis, New York, Brooklyn, Cincinnati, and other cities throughout the country.

Kennedy has built over 10,000 Fire Hydrants for New York and St. Louis alone, and Chicago, Detroit, Jersey City and Cincinnati are only a few of the many cities that are using Kennedy Hydrants with complete satisfaction.

These cities have tested Kennedy equipment, and their experience with Kennedy reliability is evidenced by numerous repeat orders. No matter what service requirements or money outlay may be involved in your valve needs, you will be fully protected by the Kennedy experience of 46 years and our guarantee of performance.

Send for Catalog.

THE KENNEDY VALVE MFG. CO. ELMIRA, N.Y.

Branch Offices and Warehouses:

NEW YORK, 128-132 White St.
SAN FRANCISCO, 448-450 Tenth St.
BOSTON, 47 India St.
CHICAGO, 228 N. Jefferson St.

Sales Offices:

Salt Lake City — Los Angeles
El Paso — Philadelphia
Seattle — Cleveland
Kansas City, Mo. — Miami

CAST IRON PIPE
AND FITTINGS

American Cast Iron Pipe Company
Birmingham, Ala.

SALES OFFICES IN PRINCIPAL CITIES

JAMES B. CLOW & SONS

General Offices:

534-546 South Franklin Street, Chicago

Works:

Coshocton, O. Chicago, Ill. Newcomerstown, O.

Sales offices in all principal cities

Manufacturers of Cast Iron Pipe and Fittings

DONALDSON IRON CO.

EMAUS, LEHIGH CO., PA.

MANUFACTURERS OF

CAST IRON PIPE

FOR WATER AND GAS

ALSO SPECIAL CASTINGS AND FLANGE WORK

UNIVERSAL
CAST IRON
PIPE

No lead, no pouring, no bell holes to dig. Standard 6-foot lengths convenient to handle and easy to lay. Used the country over for dependable water supply and fire protection lines.

THE CENTRAL FOUNDRY COMPANY
(Subsidiary of Universal Pipe and Radiator Company)
41 EAST 42nd STREET, NEW YORK
Chicago Birmingham San Francisco Los Angeles

TRADE "LEADITE" MARK

Registered U. S. Patent Office

FOR JOINTING CAST IRON WATER MAINS

NO CAULKING

Saves 50% to 75%

LEADITE is the pioneer self-caulking substitute for pig lead.

Be Sure It Is LEADITE and Accept No Imitations.

Leadite Joints Improve with Age

THE LEADITE COMPANY

1511 LAND TITLE BUILDING, PHILADELPHIA, PA.

AMERICAN AND NEW NIAGARA WATER METERS

SOLID CASING TYPE

FROST BOTTOM TYPE

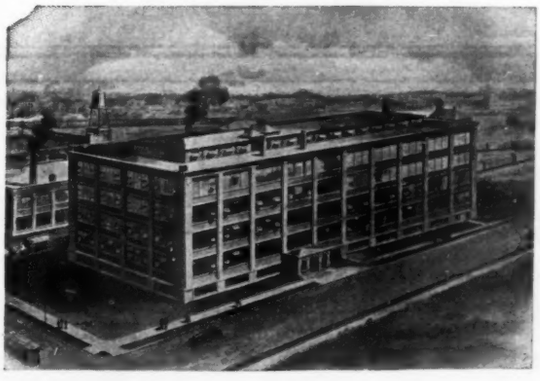
American and Niagara Meters are the most complete line of disc water meters made in one factory. Somewhere in this line of meters will be found a type of casing, register and dial that will suit the preference of any purchaser or the requirements of any service conditions where a disc meter is used.

Niagara and American Meters are made in ten different pipe sizes having either round reading register or straight reading register. In the 5/8", 3/4" and 1" sizes, the casing may be of the breakable frost bottom type as well as the solid casing type.

The working parts are of one best model. The submerged bearings are protected against the entrance of sand and sediment, the intermediate gears revolve on pivot bearings and the measuring disc is reinforced with a perforated metal plate.

Each Niagara and American Meter is individually tested and adjusted according to the Standard Specifications for water meters adopted by the American Water Works Association.

Let us send you large new Catalog and quote prices.



BUFFALO METER CO.

Est. 1892

2920 Main Street Buffalo, N. Y.

McWANE CAST IRON PIPE precalked

with the Factory-Made Joint

No Joint Materials to Buy or Handle

They are all in place and included with the pipe. That's the McWane Idea. The joint is made at the factory—not in your trench. All you have to do is calk the joints.

That's the reason you can lay McWane Pipe three times as rapidly as ordinary bell-and-spigot pipe. Save half the labor. Lay it in water or mud.

This McWane PRECALKED Joint should not be confused with other "prepared joints." They have nothing in common. The McWane Joint is the greatest forward step in cast iron pipe production taken in the last 50 years.

The facts about it are eye-openers!
Write for them.

McWANE CAST IRON PIPE CO.

General Offices: BIRMINGHAM, ALA.

819 Bankers Trust Bldg. Philadelphia, Pa. 422 Central Bldg. Los Angeles, Calif. 1807 Santa Fe Bldg. Dallas, Texas
208 S. La Salle St., Chicago, Ill.

HYDRAULIC AND SANITARY EQUIPMENT

SCREENS FOR SEWAGE AND TRADE WASTE
CENTRIFUGAL PUMPS
GATES—VALVES—CONTROL APPARATUS

THE SANITATION CORPORATION
165 BROADWAY NEW YORK CITY

SLUICE GATES

SHEAR, FLAP, PLUG DRAIN
AND
BUTTERFLY VALVES

FLEXIBLE JOINTS

COLDWELL-WILCOX CO.
Box 574 Newburgh, N. Y.

"WATCH DOG"

WATER METERS

Disc Current and Compound Types

GAMON METER COMPANY
280-294 South Street NEWARK, N. J.

DeLaval Centrifugal Water Works Pumps

Handle Water at Lowest Cost

If interested in Geared Steam Turbine Driven Pumps, Electric Motor Driven Pumps, or Internal Combustion Engine Driven Pumps, ask for our catalog W-53.

DeLaval
Steam Turbine Co., Trenton, N.J.

Liquid EBG Chlorine

For Sewage Disinfection

Electro Bleaching Gas Co.
PIONEER MANUFACTURERS of LIQUID CHLORINE
Plant: NIAGARA FALLS, N.Y.
Main office 9 East 41st Street New York.

SAN-EQUIP SEPTIC TANKS

For Better Sewage Disposal in Unsewered Districts

Follows U. S. Public Health Service design. Made of 14 gauge Copperoid iron, rust-proof enameled, water-tight, unbreakable. Sold and installed by plumbers. Saves time and trouble for city officials. Thousands in use, no failures.

Learn the merit of SAN-EQUIP Septics for areas not served by sewers. May we send you full data?

Chemical Toilet Corporation
867-887 Free Street
SYRACUSE NEW YORK

THE BOURBON COPPER AND BRASS WORKS

MANUFACTURERS OF

FIRE HYDRANTS, STOP VALVES AND EXTENSION VALVE BOXES

WATER WORKS AND FIRE DEPARTMENT SUPPLIES
THE BOURBON OPEN AND SHUT INDICATOR POST

Nos. 618 and 620 E. Front St. CINCINNATI, O.

WATER METERS

DISC—CURRENT—COMPOUND

The TROPIC—An all-bronze Water Meter, with connection spuds attached to the lower case. Particularly designed for warm sections of the country.

Tropic

Arctic

The ARCTIC—a frost-bottom Water Meter, especially designed for cold sections of the country.

These two meters embody exactly the same mechanical features, the only difference being the changes necessary to provide a frost-breaking feature in the Arctic.

Either of these meters will be equipped with a COMPLETELY ENCLOSED intermediate train RUNNING IN OIL, if desired.

Write or Wire nearest office for full information.

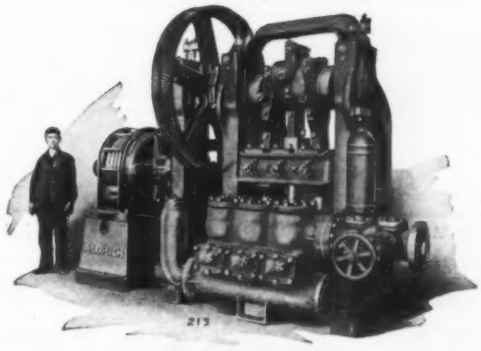
PITTSBURGH METER CO.

7800 Susquehanna St., Pittsburgh, Pa.

New York Chicago Kansas City
Columbia, S. C. Seattle Los Angeles

ALDRICH

THE ALDRICH PUMP COMPANY
ALLENTOWN, PENNA.



HIGH ECONOMY
LOW MAINTENANCE

Two dominant features
in Aldrich Pump performance

VERTICAL HORIZONTAL **POWER** TRIPLEX QUINTUPLEX

PUMPS

Municipal Filtration

PURE CLEAN WATER
INSURED BY USING
NORWOOD EQUIPMENT

Write for Information

NORWOOD ENGINEERING CO.

FLORENCE MASS., U. S. A.

Broadway Central Hotel

667-677 BROADWAY
NEW YORK

Accommodations for 1000 guests. In the heart of the down-town business section.

Connections to all parts of the City within a few minutes from our door.

NEWLY FURNISHED AND RENOVATED

High class service at low rates.

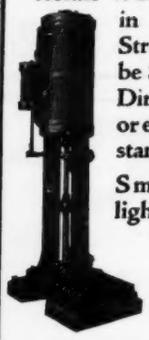
Large Banquet and Convention Halls.

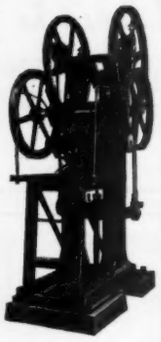
ARRANGE FOR YOUR CONVENTIONS AT OUR HOTEL

TRADE MARK
DOWNIE
REGISTERED U. S. PATENT OFFICE
DEEP WELL PUMPS

Downie Deep Well Pumps are offered for Heavy, Continuous Service in Deep Artesian Wells. They are built in Double and Single Stroke Models and may be Steam Driven, Belted, Direct Geared to Motor, or equipped for any other standard form of drive.

Smaller Pumps for lighter service.





Catalog No. 6 on request.

Downie Centrifugals, single and multi-stage, Catalog 801.

Keystone Driller Company
170 Broadway, New York Monadnock Block, Chicago Joplin, Mo.
Beaver Falls, Pa.

AT THE ROAD SHOW the NEW KEYSTONE will be found in the Annex. See it.

PUMPS

A Type for Every Service
Bulletins on request

The Goulds Manufacturing Company
SENECA FALLS, N. Y.

GOULDS

READING PIPE

CORROSION, the cancer of metal, is an ever present menace to pipe and property.

Reading Genuine Wrought Iron Pipe has the greatest rust resistance.

In numberless instances Reading Pipe has been found to outlast the building in which it was installed.

Reading Iron Company
Reading, Pa.
World's Largest Makers of Genuine Wrought Iron Pipe

Boston, Philadelphia, Seattle, Dallas, Pittsburgh, Chicago, New York, Baltimore, Cincinnati, Los Angeles, St. Louis, San Francisco

GLAMORGAN PIPE & FOUNDRY CO.
LYNCHBURG, VA.
GENERAL FOUNDERS AND MACHINISTS
Manufacturers of
CAST IRON PIPE
For Water and Gas, Flange Pipe and Fittings
Western Office: 486 Peoples Gas Bldg., Chicago

LYNCHBURG FOUNDRY COMPANY
Manufacturers of
CAST IRON PIPE AND FITTINGS
Main Offices: LYNCHBURG, VA.
Works at Radford, Va., and Lynchburg, Va.

National Cast Iron Pipe Co.
Birmingham, Ala.
Manufacturers of
Cast Iron Water and Gas Pipe
SALES OFFICES:
Peoples Gas Building, Chicago, Ill.
Santa Fe Bldg., Dallas, Texas
Land Bank Building, Kansas City, Mo.
Hellman Bank Bldg., Los Angeles, Cal.

DIRECT OXIDATION

SEWAGE AND WATER TREATMENT

INQUIRIES INVITED

FROM

ENGINEERS

C. P. LANDRETH

OPERATING THROUGH HIS OWN ORGANIZATION

DIRECT OXIDATION PROCESS CORP.

N. W. COR. 17th AND LEHIGH AV.

PHILADELPHIA

PENNA.

Another New Gurley Transit

1925 Reconnoissance Model

SPECIFICATIONS

Telescope — 8½" long, erecting eyepiece, 19x. 3¼" Telescope Level.

Horizontal Circle — 5.00" diameter, one vernier reading to single minutes.

Vertical Circle — 5.00" diameter, one vernier reading to single minutes, detachable guard.

Compass — 3½" Needle; movable variation circle.

Standards — New sturdy A-frame design.

Leveling Head — 4 screw type, large shifting center; bakelite heads on nickel-alloy screws.

Accessories — Light weight extension leg tripod, mahogany box containing usual accessories.

Weight — Transit 10 lbs., Tripod 8 lbs., Box 8 lbs.

Price — No. 102 "ABGED" $250.00 f. o. b. Troy, N. Y.

Completely rebuilt, the new Gurley Reconnoissance Transit provides a suitable instrument for railroad and highway construction, building work and general surveying. It is a convenient transit to always carry in an auto and, since it fits the standard Gurley tripod, makes a handy companion to the heavier instruments.

Send for Bulletin T-21

W. & L. E. GURLEY

Instrument Makers Since 1845

TROY, N. Y., U. S. A.

A VISIT in St. Louis need not involve extravagant cost for pleasant hotel accommodations. At Hotel Marquette, you will always find comfort and convenience available at moderate cost. You will have congenial people for your fellow guests, and a staff well trained in all the details of good service. The location of Hotel Marquette, within sight of the Union Station in the heart of the wholesale district and just a few minutes from the retail center, is not surpassed for convenience anywhere in St. Louis.

Rates: { One Person, $2.00 and up
Two Persons, $3.00 and up

HOTEL Marquette

Washington at 18th St. Louis

CADILLAC YATES HOTEL

CORNER of BROADWAY and 43rd STREET

NEW YORK

Overlooking Times Square

SINGLE ROOMS

Shower or Tub Baths	$3.00 to $4.00 per day
Without Baths	$2.00 to $3.00 per day

DOUBLE ROOMS

With Bath	$5.00 to $8.00 per day
Twin Beds with Bath	$6.00 to $8.00 per day
Twin Beds Running Water	$5.00 to $6.00 per day

CONNECTING ROOMS

Two Persons with Bath	$6.00 to $7.00 per day

RATES FOR PARLOR BEDROOMS AND BATHS UPON APPLICATION

In making reservations it is important that the hour of arrival be stated in addition to the day and date, as reservations are not held after 7 P. M. except on special request.

JOSEPH E. GOULET, Managing Director

SWEET'S TRACK MATERIALS

WILL HELP YOU DO THE JOB BETTER & QUICKER

Write for Descriptive Catalog

SWEET'S STEEL CO. - Williamsport, Pa.

NEW ORLEANS LOUISIANA
36 TON PLANT

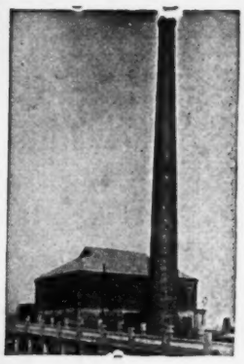
DECARIE INCINERATORS

for Municipalities and Institutions

We are one of the oldest concerns in the United States engaged in the erection of incinerators for the final disposal of municipal refuse.

Our plants are of a distinctive type, and of scientific design, passed upon years of experience. We have over 50 municipal installations in the United States and Canada. Among these are 15 repeat orders. Write us the conditions in your city and our engineers will furnish you with preliminary plans and proposals for the proper size of plant for your requirements.

Decarie Incinerator Corporation
342 Madison Ave. New York, N. Y.



RAVENSWOOD NEW YORK CITY
100 TON PLANT

JOINTITE

A SEWER PIPE JOINT COMPOUND

No caulking is necessary with JOINTITE. Alternate joints may be poured on the bank. Easily handled and placed. No skilled help required. Sets as soon as poured. Adheres to the pipe.

6 CATALOGS

on Airlock Apparatus for Sewers and Sewage Disposal

Catalog No. 22—Flush tank Siphons, Water Regulators.
Catalog No. 25—Automatic Siphons for Domestic Septic Tanks.
Catalog No. 21—Pneumatic Sewage Ejectors.
Catalog No. 29—Sewer Pipe Joint Compound.
Catalog Nos. 23 and 24—Automatic Siphons for Large Municipal Disposal Plants, etc.
Catalog No. 27—Imhoff Tanks.

Catalogs mailed on request.

PACIFIC FLUSH-TANK CO.

4241 Ravenswood Avenue, Chicago
Singer Building, New York

D&D

SAFETY and NOISELESS Manhole Cover

Does away with rattling or dishing

Our foundries and machine shops are equipped to handle work on a production scale. No order too large or small.

A large stock of stock patterns on hand and prompt deliveries assured. Special castings of soft gray iron from drawings or blueprints. We can also machine any castings to size.

Full particulars on request—send for catalogue.

WM. E. DEE COMPANY

30 N. La Salle Street Chicago, Ill.

Manhole, Catch Basin and Sewerage Castings of All Kinds. We Make Anything in Gray Iron
Write for Our Prices

Robinson Quick Service

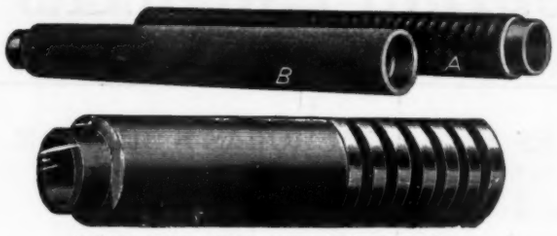
Prompt Shipments of VITRIFIED SEWER PIPE

FLUE LINING ~ WALL COPING
FIRE BRICK ~ FIRE CLAY Etc.

12 PLANTS
110 CARS PER DAY

The Robinson Clay Product Co.
Akron, Ohio

STANDARD WOOD PIPE



MORE DURABLE AND ECONOMICAL

Will furnish pipe to suit conditions.
Write for catalogue for full information.

STANDARD WOOD PIPE COMPANY
WILLIAMSPORT, PA.

LOCATE LEAKS
BY SOUND
WITH THE
GEOPHONE

QUICK, UNFAILING, ACCURATE

Write for Prices and Description

Empire Electric & Water Co., Inc.
452 Lexington Avenue New York City

GODER PROSPERITY IS BUILT ON RESULT OBTAINED BY USE OF

GODER INCINERATORS

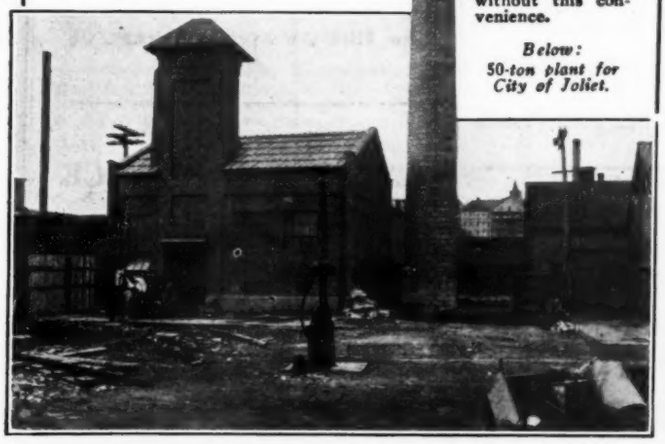
We have demonstrated that the old type Garbage Crematory with its low efficiency, high cost of operation and vast consumption of auxiliary fuel is no longer a necessary evil—it can be replaced by a "Goder."

Goder Incinerator Corp.
323 N. Michigan Boulevard
Chicago, Illinois

All Goder Incinerators are free from malodors either from stack or apparatus. This means that they may be located conveniently.

Economics effected in labor and hauling and in salvage of heat often enable our patron to operate a "Goder" at a distinct profit, as against doing without this convenience.

Below:
50-ton plant for City of Joliet.



Darling Gate Valves
For Water Main Service

Large DARLING GATE VALVE operated in horizontal position.

It may not be necessary to touch a gate valve over a long period of time, but sooner or later the emergency will arrive. When that time comes quick action is essential.

The biggest Darling Gate Valve can be opened or closed by one man easily and quickly. The discs, a feature of Darling Valve construction serve as wheels and carry the load as no other type of valve can. Since these discs revolve, seating in a different place each time the valve is operated, uneven wear is prevented.

Detailed information on request.

Darling Valve and Manufacturing Co.
Williamsport, Pa.

New York Chicago Oklahoma City Houston

Also manufacturers of the Darling Fire Hydrant

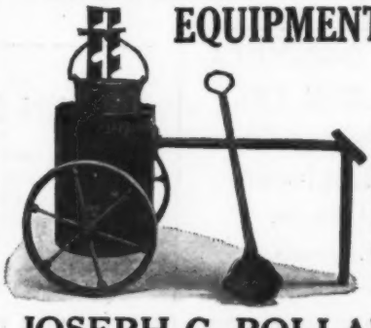
CEMENT LINED SERVICE PIPE

Guaranteed Against Injury From Handling. Specially Designed Fittings That Make Perfect Joints.

CEMENT LINED PIPE COMPANY
LYNN, MASS.

Formerly Lap-Joint Impervious Pipe Co.

SEND FOR YOUR PIPE LINE EQUIPMENT CATALOG



Every needed tool and appliance illustrated and described. Leading Gas and Water Companies are using Pollard equipment. Your copy of catalog mailed on request.

JOSEPH G. POLLARD CO., Inc.
146 Raymond St., Brooklyn, N. Y.

DIRECTORY OF CONSULTING ENGINEERS

ENGAGED IN MUNICIPAL AND PUBLIC WORK

ALVORD, BURDICK & HOWSON

John W. Alvord
Charles B. Burdick Louis R. Howson

Engineers

for

Water Works, Water Purification, Flood Relief, Sewerage, Sewage Disposal, Drainage, Appraisals, Power Generation.

Hartford Bldg. Chicago

THE AMERICAN APPRAISAL CO.

Milwaukee New York

Authoritative Reports and Valuations covering Public Utility, Municipal, Mineral, Industrial, Commercial and Residence properties.

BLACK & VEATCH

Consulting Engineers

Mutual Building, Kansas City, Mo.

Sewerage, Sewage Disposal, Water Supply, Water Purification, Electric Lighting, Power Plants, Valuations, Special Investigations, Reports.

E. B. Black N. T. Veatch, Jr.

BROSSMAN, CHAS.

Consulting Engineer

Merchants' Bank Building
Indianapolis, Ind.

Water Supply. Sewerage and Disposal. Lighting Plants—Supervision of Construction and Operation. Appraisals—Expert Testimony.

BURNS & McDONNELL ENGINEERING CO.

McDonnell-Smith-Baldwin-Lambert

Consulting Engineers

Waterworks, Sewerage,

Lighting, Appraisals,

Rate Investigations

Kansas City, Mo. Interstate Bldg.
Los Angeles, Cal. Marsh-Strong Bldg.

CAIRD, JAMES M.

Assoc. Am. Soc. C. E.

Chemist and Bacteriologist

Office and Laboratory:

92 Fourth Street, Troy, N. Y.

Water Analysis and Tests of Filter Plants

DAVIS, B. H.

Consulting Engineer

Monumental Reinforced Concrete Bridges of All Types for Parks, Cities, Counties, States and Railroads. Consultations, Estimates, Plans, Specifications and Supervision.

Whitehall Building, New York

DOW & SMITH

Chemical Engineers

Consulting Paving Engineers

A. W. Dow, Ph.B. F. P. Smith, Ph.B.

Mem. Am. Inst. Ch. Engrs.
Mem. Am. Soc. Civ. Engrs.

Asphalt, Bitumens, Paving, Hydraulic Cement, Engineering Materials.

131-3 East 23rd St., New York

New York City 116 W. 39th St.

A. E. HANSEN

Hydraulic and Sanitary Engineer

Design and Supervision of Construction

Sewerage	Water Works
Sewage Disposal	Water Purification
Drainage	Water Works Valuation
Garbage Disposal	Water Analysis

HAZEN & WHIPPLE

Hydraulic and Sanitary Engineers, Water Supply, Sewerage, Drainage, Valuations, Plans, Supervisions of Construction and Operation.

ALLEN HAZEN C. M. EVERETT
L. N. BABBITT MALCOM PIRNIE

25 W. 43rd St., New York City

NICHOLAS S. HILL, JR.

Consulting Engineer

Water Supply Sewage Disposal
Hydraulic Developments

Reports, Investigation, Valuations, Rates, Design, Construction, Operation, Management, Chemical and Biological Laboratories

112 East 19th Street
New York City

PEARSE, GREELEY & HANSEN

Hydraulic and Sanitary Engineers

Reports, Designs, Supervision, Appraisals, Water Supply, Sewerage, Water Purification, Sewage Treatment, Refuse Disposal.

6 No. Michigan Avenue, Chicago, Ill.

CLARENCE D. POLLOCK

Mem. Am. Soc. C. E.
Consulting Engineer

Pavements, Highways, Drainage, Sewerage, Town Planning and General Municipal Problems.

Reports, Specifications, Supervision.

Park Row Bldg. New York City

ALEXANDER POTTER

50 Church St., New York City

Phone: Cortlandt 5501

Civil and Sanitary Engineer

Specialties: Water Supply, Sewerage and Pavements.

The VENTURI Meter

For Main Pipe Lines

Interesting Bulletins

BUILDERS IRON FOUNDRY
PROVIDENCE, R. I.

THE ACTIVATED SLUDGE SEWAGE TREATMENT PLANT YOU HAVE IN MIND IS EQUIPPED WITH

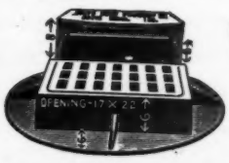
FILTROS DIFFUSER PLATES

GENERAL FILTRATION CO., Inc.
Cutler Building ROCHESTER, N. Y.

South Bend Foundry Co.

SOUTH BEND, INDIANA

Adjustable Curb Inlet

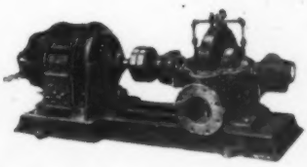


All Kinds of
Gray Iron Castings
Patent Chilled
Manhole Covers

WRITE FOR CATALOG AND PRICES

Made in 250, 300, 350 and 400, 470, 490 lbs. Weights

Pumping Water is Serious Business



Every dollar spent for pumping is a continuous expense and if the pump is not efficient the waste goes on day after day, year after year. It can be corrected by selection of proper equipment. Often a good motor operates a poorly designed pump. At small expense such waste can be made a saving.

Put your pump problem up to us. It will cost nothing to learn how much can be saved and the cost of saving it.

Economy Pumping Machinery Co.
99-124 North Curtis Street
Chicago

The Book

on Construction Equipment

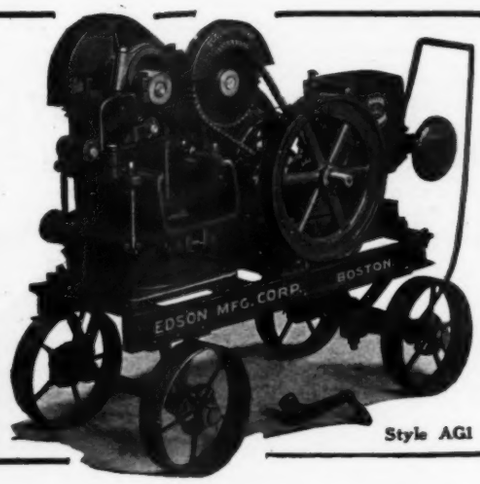
Here is a new book that helps the user of construction equipment to get the most out of every dollar he spends. It contains in convenient alphabetical arrangement, complete cost data on every kind of construction equipment.

HANDBOOK OF CONSTRUCTION EQUIPMENT
Its Cost and Use
By Richard T. Dana

849 pages, flexible, 351 illustrations, $6.00 net, postpaid.

The aim of the book is to assist the contractor and the engineer in the selection and application of the best methods in the least time. It eliminates guess and enables cost estimates to be made on the basis of definite knowledge.

Public Works 243 West 39th St. New York City



Style AG1

EDSON

Reg. U. S. Pat. Off.

DIAPHRAGM PUMP SPECIALTIES
Hand, Gasolene and Electric Outfits
HEAVY DUTY One or Two Pump UNITS with 3-inch or 4-inch Suction

For QUALITY specify GENUINE EDSON Pumps, Suction Hose, Diaphragm with Bead, etc.

EDSON MANUFACTURING CORP.
375 Broadway, Boston, Mass.

Write for new Catalog "T"
Agencies in Principal Cities

New York—7 Water Street

Keep Right On Building This Winter

Bears and ground hogs still hibernate. But engineers, architects, contractors and building owners don't let winter drive them to cover.

They know that "time is money"—that winter is just as good as any other time to build; so they keep on building in cold weather.

The building industry, as well as the public, recognizes that this practice is not only practical but usually profitable for all concerned.

Winter construction means that builders can continue their work without interruption through twelve months. The builder's crew, which has been trained to maximum efficiency, can be kept intact and steadily employed with profit to everyone.

Winter construction by providing quicker occupancy, brings to the owner an earlier return on his investment.

During the winter there are few delays in getting material. Sand and stone are usually nearby; cement is obtainable on short notice practically anywhere. And these materials come to you ready for use—you make your building right on the job.

In winter, as in summer, concrete is the last word in speed of construction—the champion time saver.

If you have not yet experienced the advantages of winter building, plan now to do so.

And remember, where "time is money" use concrete.

* * *

The few fundamental principles of cold weather construction are simple and easy to apply. If you are not familiar with them, ask our nearest District Office for literature on winter building. There is no obligation.

Portland Cement Association

A National Organization to Improve and Extend the Uses of Concrete

Atlanta	Des Moines	Minneapolis	Pittsburgh
Birmingham	Detroit	Nashville	Portland, Ore.
Boston	Indianapolis	New Orleans	Salt Lake City
Charlotte, N. C.	Jacksonville	New York	San Francisco
Chicago	Kansas City	Oklahoma City	Seattle
Columbus	Los Angeles	Parkersburg	St. Louis
Dallas	Milwaukee	Philadelphia	Vancouver, B. C.
Denver			Washington, D. C.

Certainty from experience

Purchasers of Hoist Equipment insist upon knowing, with certainty, that it has ample power for every requirement—
That it will render satisfactory service under all conditions—
That it will produce every day in the year—
That its construction is sturdy and insures stability and low maintenance cost.

Municipal engineers and contractors know from the certainty of experience that they can depend upon Wood equipment to "dump the loads and build the roads." This experience is your assurance that when you purchase Wood Hydraulic Hoists and Steel Dump Bodies you have hoist equipment which will meet your most exacting requirements.

WOOD HYDRAULIC

Hoist and Steel Dump Bodies

Fifteen years of experience and diligent application of sound engineering principles have made Wood Equipment the Recognized Standard of the World. Sold and serviced by factory branches and distributors in all large cities.

Factories in the United States, Canada and Europe.

Write for our new illustrated folder, in colors, which shows superior construction features and method of operation.

Wood Hydraulic Hoist & Body Co.

World's Largest Builder of Hydraulic Hoists and Steel Dump Bodies

7934 Riopelle Street Detroit, Michigan

The Bay City 16-B
See It at the Road Show
Chicago—January 11 to 15 Incl.

Excavating Sewer Trench—New Jersey

We were crowded into balcony space in the Coliseum, but you can see the Bay City IN ACTION with skimmer and trench scoop at the corner of 16th and Wabash—same block as the Coliseum.

The Bay City is worth investigating and worth owning

It is a quality machine for continuous service

Our new Catalogs 24 and 25 completely describing model B and our smaller half yard models are ready.
Write for your copy

For Pavement Excavation Road or Sewer Work

Typical Bay City Skimmer Work

Removing Macadam Surface—Cut 8 to 12 in.

Operates Skimmer—Clamshell—Ditcher—Shovel

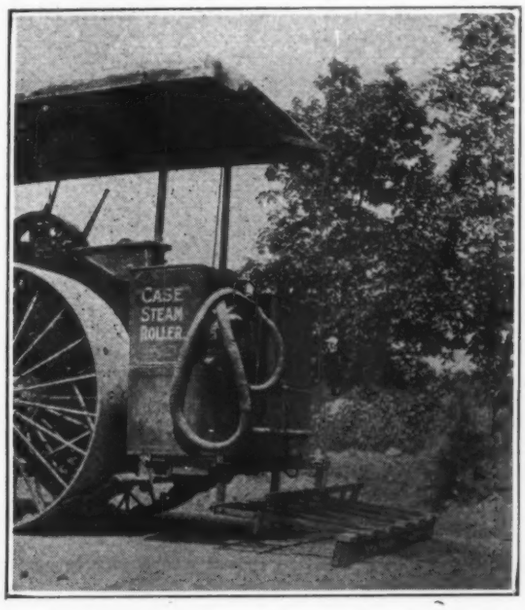
ALL STEEL

The Skimmer That Stands Up Under Severe Service

Bay City Dredge Works
BAY CITY, MICH.

New York Office, 382 Broadway
Mfrs.—Walking Land Dredges—Power Shovels—Excavators

For Water Bound Macadam Construction
FREEMAN'S
Sweeping Attachment



Saves $100 to $500 Per Mile

The complete filling of the spaces between the ballast with the finer material is a vital factor in the construction of a good water bound Macadam roadway. To do this by hand sweeping is expensive.

THE FREEMAN MECHANICAL SWEEPER attached to the roller will do this work while the road is being rolled far better than it can be done by hand and at practically no expense.

A saving of $100 to $500 per mile is made, depending on the width of the roadway and the thoroughness of the hand sweeping. A further saving is affected from the fact that by a continuous sweeping less rolling is required to thoroughly bed the ballast and little fine material is wasted, all being worked into the road.

Write for further particulars

J. M. FREEMAN
Elizabethtown, Pa.

GALION

The Big Line of Road-Building Equipment

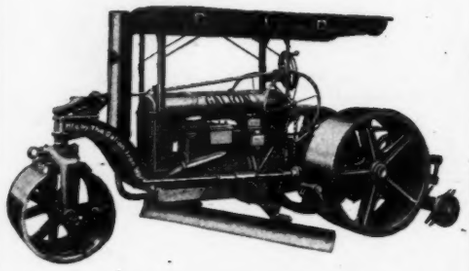
Built by Specialists in the largest and best equipped Plant in the world. Galion meets the needs of Road Builders everywhere with a complete line of Rollers, Graders, Maintainers, Drags and other road-building and maintenance equipment.

Twenty years of successful service have given Galion products an unequalled prestige among Road Builders.

At the same time the Galion line includes the newest and best developments in the industry, among them a four cylinder motor roller and the line of Fordson Junior Rollers, Tandem Rollers and Graders.

Write for catalogs and complete information on the Galion Equipment you need.

GALION FORDSON



JUNIOR MOTOR ROLLER

Made in 3, 4, 5, 6 and 7 ton sizes.

Roller, Scarifier, Planer and and Tractor.

See our exhibit at the Good Roads Show, Chicago

The Galion Iron Works and Mfg. Co.

Galion, Ohio

INDIAN ROAD OILS

There is a difference in Road Oils as in every other commodity. Indian Road Oils are made in the same great Refinery where Indian Gasoline, Havoline Oil and other famous petroleum products are produced.

Uniformity, the finest quality and service that delights the buyer are synonymous with this great independent oil organization.

We invite your inquiries

INDIAN REFINING CO.

INCORPORATED

LAWRENCEVILLE, ILL.

Would You Like to Move More Earth Per Day at Less Cost Per Cubic Yard?

Every contractor and engineer would, yet hundreds have failed to investigate the dirt moving ability of The Miami-Fordson (one-man) Scraper.

If you are one of them better take the time right now to write and get full details of this dirt mover that is moving 100 cubic yards and more of earth per day, on a four hundred foot round trip haul, for 15c and less per cubic yard.

These figures are taken from your field. For actual cost data and detailed information write today to—

THE MIAMI TRAILER SCRAPER CO.

626 S. CLAY STREET TROY, OHIO

MIAMI FORDSON ONE-MAN POWER SCRAPER

(Reg. U. S. Pat. Off.)

There is a particular Badger Water Meter for every service. They are built in sizes ranging from 5/8 in. to 6 in. Specify Badger Meters, they are designed to meet the most exacting water works requirements.

Specify "Badgers"

You can conscientiously specify Badger Water Meters and be assured that they will perform dependably year-after-year. Because they are designed by practical water works engineers, they are equal to their work.

Write for special bulletins.

Badger Meter Mfg. Co.

843 30th St. Milwaukee, Wis.

BRANCHES:

111 W. Washington Street, Chicago, Ill.
32 Court Street, Brooklyn, N. Y.
414 Interstate Bldg., Kansas City, Mo.
1621-39 Fifteenth Street, Denver, Colo.
4038 Arcade Bldg., Seattle, Wash.

BADGER METERS

McWANE CAST IRON PIPE precalked with the Factory-Made Joint

Cuts Pipe Laying Costs in Half

McWane Precalked Joint Cast Iron Pipe can be laid three times as fast as other cast iron pipe, and with half the labor. The joint is factory-made. You don't have to make it in your trench. You just calk the Joints.

Millions of feet in service in 46 states. Pipe sizes: 1¼ to 8 inches—standard lengths.

Send for our Catalog N.

McWANE CAST IRON PIPE CO.

General Offices: BIRMINGHAM, ALA.

819 Bankers Trust Bldg. Philadelphia, Pa.
298 S. La Salle St. Chicago, Ill.
422 Central Bldg. Los Angeles, Calif.
1807 Santa Fe Bldg. Dallas, Texas

INDEX TO ADVERTISEMENTS

A

Acme Road Machinery Co..... 12
Adams, J. D., & Co..... 27
Aeroil Burner Co..... 9
Alabama Pipe Co..... 90
Aldrich Pump Co..... 101
Alvord, Burdick & Howson..... 106
American Appraisal Co..... 106
American Cast Iron Pipe Co..... 98
American Cement Machine Co..... 80
Amer.-La France Fire Engine Co.. 61
American Steam Pump Co..... 81
American Vibrolithic Corp..... 32
Asphalt Association..... 29
Aurora Pump Mfg. Co..... 80
Austin-Western Road Mach. Co.... 2

B

Badger Meter Mfg. Co..... 111
Baker Mfg. Co..... 23
Barber- Green Co..... 17
Barrett Co., The..... 75
Bay City Dredge Works..... 109
Beaver Mfg. Co..... 20
Black & Veatch..... 106
Bourbon Copper & Brass Wks. Co.. 101
Broadway Central Hotel..... 101
Brossman, Chas. 106
Buckeye Traction & Ditcher Co... 22
Buffalo Meter Co..... 99
Buffalo-Springfield Roller Co..... 58
Buhl Co., The 24
Builders' Iron Foundry..... 107
Burch Plow Works Co..... 82
Burns & McDonnell Eng. Co..... 106
Byers Machine Co..... 11

C

Cadillac Yates Hotel..... 103
Caird, James M..... 106
Carey, Philip Co..... 4
Carter, Ralph B..... 82
Cast Iron Pipe Publicity Bureau... 93
Caterpillar Tractor Co..... 76
Cement Lined Pipe Co..... 105
Central Foundry Co..... 98
Chausse Oil Burner Co..... 82
Chemical Toilet Corporation..... 100
Chicago Automatic Conveyer Co.... 35
Clay Products Association..... 88
Cleveland Tractor Co..... 30
Climax Engineering Co..... 14
Clow, James B., & Sons..... 98
Coldwell-Wilcox Co..... 100
Connery & Co., Inc..... 7
Continental Motors Corp..... 34
Cook, A. D..... 83
Cressy Road Sprayer Mfg. Co..... 86
Crown Rock Asphalt..... 86
Cummer & Son Co., The F. D..... 83
Curtis Pneumatic Mach. Co..... 78
Cyclone Fence Co..... 6

D

Darling Valve & Mfg. Co..... 105
Davis, B. H..... 106
Decarie Incinerator Corp..... 104
Dee, Wm. E., Co..... 104
De Laval Steam Turbine Co..... 100
Direct Oxidation Process Corp..... 103
Dixon, Jos., Crucible Corp..... 83
Domestic Engine & Pump Co..... 47
Donaldson Iron Co..... 98
Dorr Co. 5
Dow Chemical Co..... 38
Dow & Smith..... 106

E

Eastern Clay Products Ass'n..... 91
Economy Pumping Machinery Co.. 107
Edson Mfg. Co..... 107
Electro Bleaching Gas Co..... 100
Empire Elect. & Water Co..... 105
Erie Machine Shops..... 64
Erie Steam Shovel Co..... 62
Evans, F. H., Est..... 60
Everhot Mfg. Co..... 82

F

Farasey, J. D., Mfg. Co..... 83
Firestone Tire & Rubber Co..... 63
Ford Motor Co..... 55
Freeman, J. M..... 109
French Co., A. W..... 80
Full-Crawler Co. 62

G

Galion Iron Works & Mfg. Co..... 110
Gamon Meter Co..... 100
General Filtration Co..... 107
Glamorgan Pipe & Foundry Co..... 102
Goder Incinerator Corp..... 105
Good Roads Mach. Co..... 33
Goulds Mfg. Co..... 102
Gurley, W. & L. E..... 103

H

Hadfield-Penfield Steel Co..... 73
Handy Sack Baler Co..... 83
Hansen, A. E..... 106
Harnischfeger Corp. 13
Hauck Mfg. Co..... 56
Hazen & Whipple..... 106
Headley Good Roads Co..... 77
Heltzel Steel Form & Iron Co..... 59
Highland Body Mfg. Co..... 78
Hill, Nicholas S., Jr..... 106
Hoosier Asphalt Co..... 10
Hotchkiss Steel Prod. Co., Inc.... 66
Hotel Martinque 88
Huber Mfg. Co..... 81

I

Independent Concrete Pipe Co..... 113
Ingersoll Rand Co..... 84
Indian Refining Co..... 110
Insley Mfg. Co..... 3
International Motor Co..... 25

J

J. T. Tractor Co..... 66
Jaeger Machine Co..... 71

K

Kennedy Valve Mfg. Co..... 98
Kentucky Rock Asphalt Co., Inc..18-19
Keystone Driller Co.....102-81
Kinney Mfg. Co.....16-21
Koehring Co. 36-37

L

Landreth, C. P..... 103
Leadite Co. 68
Link-Belt Co. 89
Littleford Bros. 60
Lock Joint Pipe Co..... 53
Lynchburg Foundry Co..... 102

M

Marquette Hotel 103
McNeil, James & Bro. Co..... 97
McWane Cast Iron Pipe Co.....99-111
Miami Trailer-Scraper Co..... 110
Mohawk Asphalt Heater Co..... 64
Moore Trench Machine Co..... 82
Mueller Co. 87

N

Nat'l Cast Iron Pipe Co.....96-102
Newport Culvert Co..... 58
Norwood Engineering Co..... 101
Nye Steam Pump & Machine Co.... 90

O

Orton & Steinbrenner Co..... 82
Ohio Valley Rock Asphalt Co..... 77
Osgood Co., The..... 81
Owen Bucket Co..... 49

P

Pacific Flush-Tank Co..... 104
Pearse, Greeley & Hanson..... 106
Penn. Salt Mfg. Co..... 92
Pittsburgh Meter Co..... 101
Pollard Co., Joseph G..... 105
Pollock, Clarence D..... 106
Portland Cement Association..... 108
Potter, Alexander. 106

R

Rawls Machine & Mfg. Co..... 85
Reading Iron Co..... 102
Robinson Clay Product Co..... 104
Russell Grader Mfg. Co., The..... 79

S

Sanitation Corporation 100
Schramm, Inc. 31
Skelton Shovel Co..... 67
Smith, A. P., Mfg. Co., The..... 94
Solvay Process Co..... 79
South Bend Foundry Co..... 107
Standard Cast Iron Pipe & Foundry Co. 97
Standard Oil Co. of Indiana..... 57
Standard Oil Co. (N. Y.)..... 65
Standard Wood Pipe Co..... 105
Sterling Eng. Co..... 92
Stewart, W. H..... 83
Sullivan Machinery Co..... 28
Sweet's Steel Co..... 103

T

Texas Co., The.....Front Cover
Thew Shovel Co..... 51

U

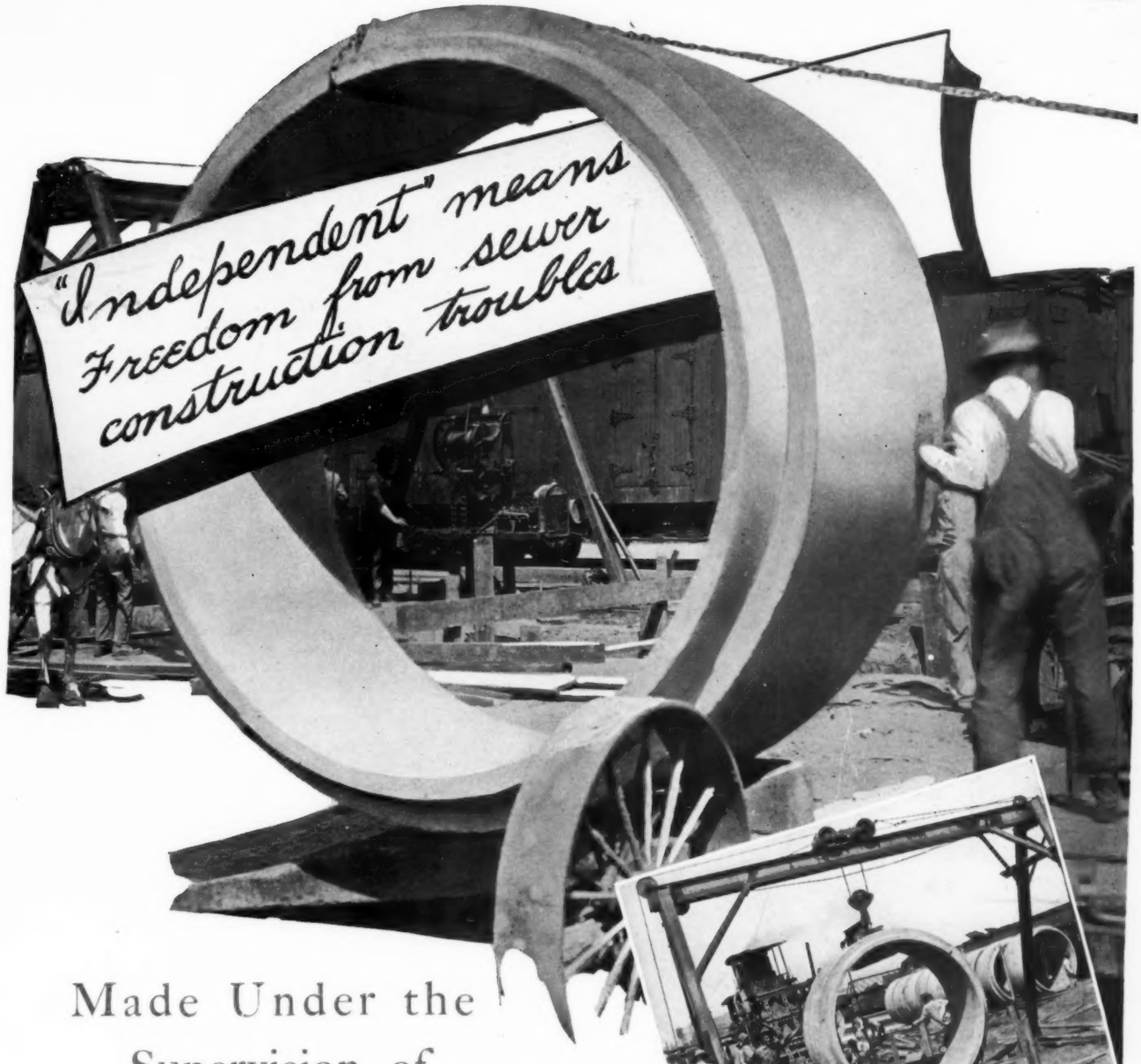
Union Iron Works..... 80
U. S. Cast Iron Pipe & Fdy. Co... 95
Universal Road Mach. Co..... 56

W

Warren Bros. Co..... 8
Watson Wagon Co..... 85
Wehr Co. 15
Westinghouse Elec. & Mfg. Co..... 26
White Co.....Back Cover
Wiard Plow Co..... 67
Wood, R. D., & Co..... 94
Wood Hydraulic Hoist & Body Co.. 108

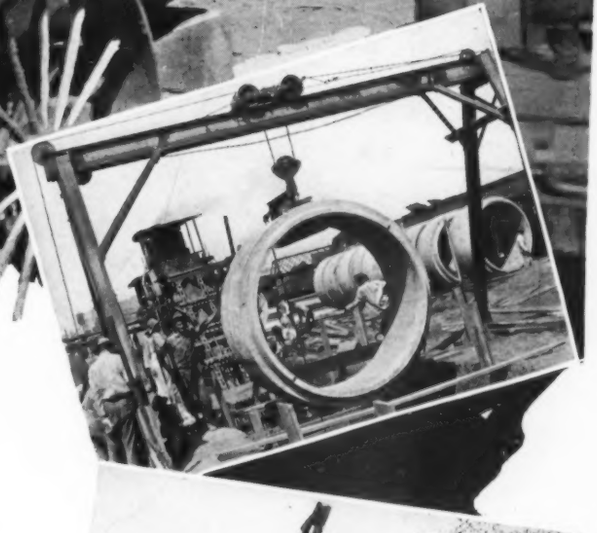
Y

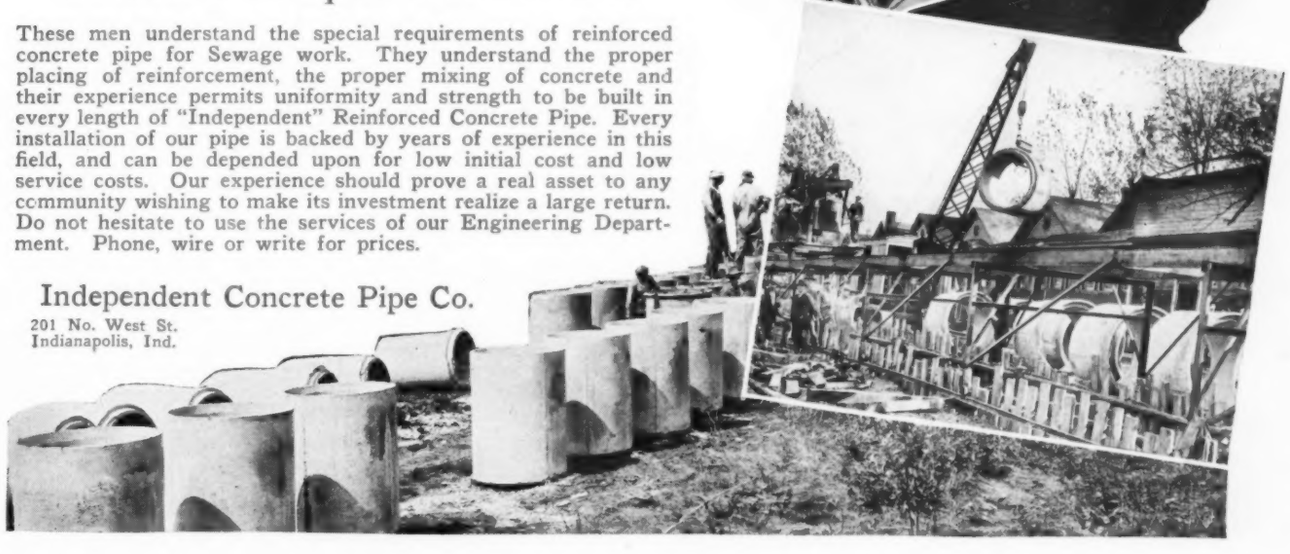
Yeomans Bros. Co..... 96



Made Under the Supervision of Trained Superintendents

These men understand the special requirements of reinforced concrete pipe for Sewage work. They understand the proper placing of reinforcement, the proper mixing of concrete and their experience permits uniformity and strength to be built in every length of "Independent" Reinforced Concrete Pipe. Every installation of our pipe is backed by years of experience in this field, and can be depended upon for low initial cost and low service costs. Our experience should prove a real asset to any community wishing to make its investment realize a large return. Do not hesitate to use the services of our Engineering Department. Phone, wire or write for prices.





Independent Concrete Pipe Co.
201 No. West St.
Indianapolis, Ind.

White Truck owned by the City of Cleveland engaged in road maintenance work. The City of Cleveland operates a fleet of 206 Whites.

5,000 Whites on the Job of Road Building

MORE than 5,000 White Trucks are used in road construction and maintenance work. Repeat orders daily emphasize the satisfaction of road contractors with White performance. They know from experience that White Trucks can be depended upon for uninterrupted service, day in and day out over a long period of years.

White Trucks are in use in every state and in hundreds of counties and municipalities, constantly demonstrating their power and endurance to economically haul crushed stone, sand, cement, brick and other road materials. Numerous Whites in the service of road contractors have traveled in excess of 100,000 miles and are still doing a full day's work.

Because of their dependability and economy White Trucks offer road contractors a tool that is without an equal in road construction and maintenance work.

There is a White Truck for every highway job—a truck of power, ruggedness and flexibility, marked by the superiority of performance and low cost of operation upon which White leadership is founded.

See the White Truck Exhibit at the Chicago Good Roads Show

THE WHITE COMPANY, *Cleveland*

WHITE TRUCKS

MADE RIGHT — SOLD RIGHT — KEPT RIGHT

PRINTED IN U. S. A.